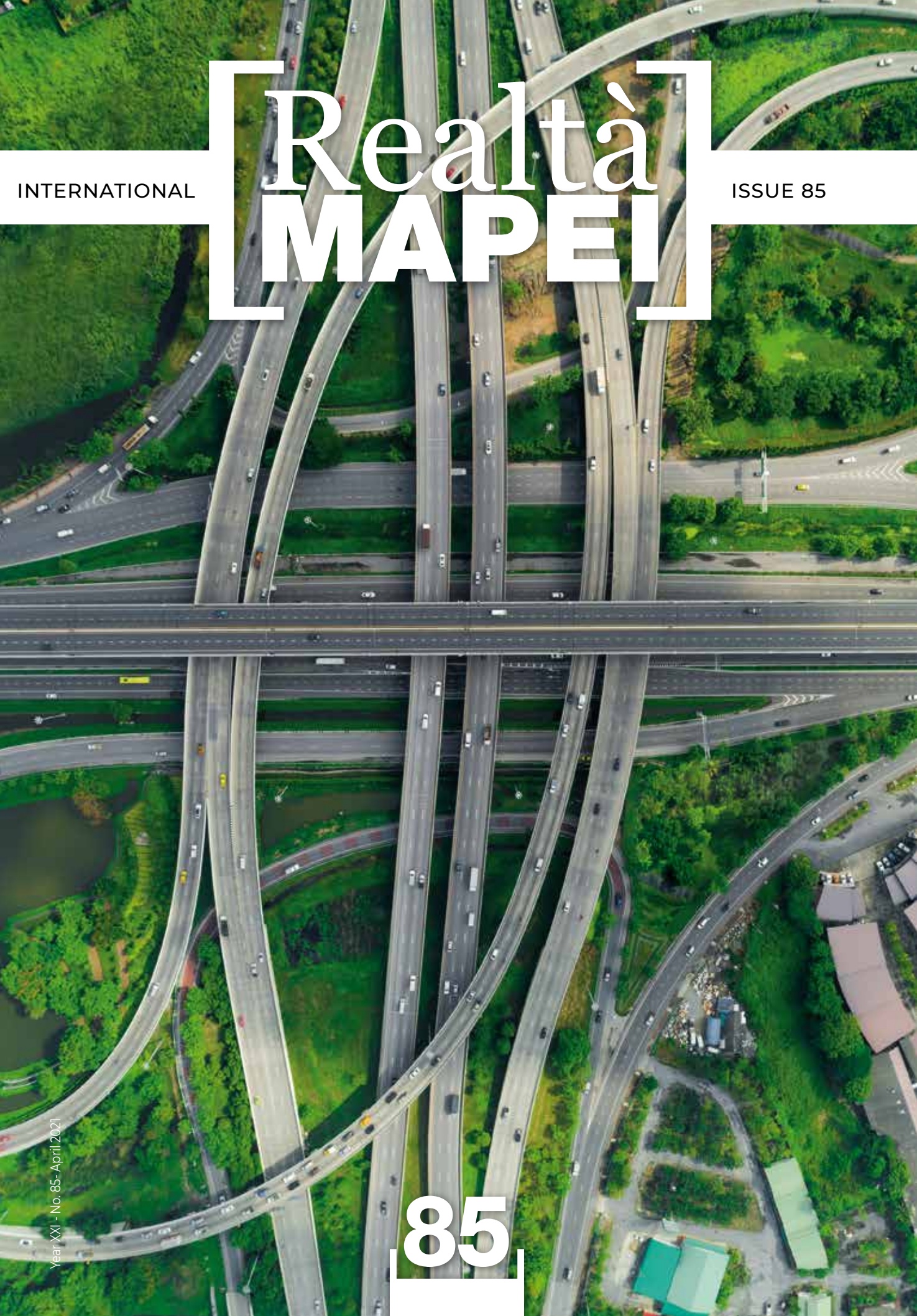

# Realtà MAPEI

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**GUIDO PALMIERI**
*Realtà Mapei International's*
Editor-in-Chief

# Innovation and sustainability: a roadmap for a long journey

Mapei is launching a new range of products for bituminous road surfaces designed for a constantly developing industry (from motorways to airport runways) that has to deal with very different production requirements: the construction of new works but also the maintenance and renovation of existing structures. The proposed products and applications have been developed in Mapei's Research & Development laboratories and meet two key demands on an ever-accelerating market: innovation and sustainability. While the circular economy has been the most recent challenge facing the economy as a whole, research has always been part of Mapei's corporate strategy and, thanks to a global network of 31 R&D centres, is the real driver behind growth processes in Italy and abroad. So, the combination of research and sustainability underscores the new Road Engineering line to which an extensive special has been devoted in this issue of *Realtà Mapei International* reviewing projects, technical features of the products, and interviews with experts and professionals.

**FROM MOTORWAYS TO AIRPORTS: MAPEI IS LAUNCHING A NEW RANGE OF PRODUCTS FOR BITUMINOUS ROAD SURFACES**

We are continuing with our presentation of Mapei products that can be used for renovate your home. This time we focus on dehumidifying systems that allow to restore masonry in every type of home: from those recently constructed to those of historic interest.

As regards protection measures, we are widening horizons to cover risks deriving from natural radioactivity, looking at Mapei's anti-Radon gas products.

This time the Teamwork section focuses on two nations. 2021 has been a memorable year for Mapei SK sro (Slovakia) and Mapei Ukraine: these subsidiaries of the Group are, respectively, celebrating 20 and 15 years in business. An opportunity to take stock of their growth and projects, and the most important works Mapei has contributed to in these nations.

The Mapei brand is associated with art and music. During this lengthy pandemic connected with the Covid-19 health crisis, these industries have been forced to shut down and find other ways to make culture's voice heard. Even in such dramatic times, Mapei has kept on supporting Web/streaming projects and events organised by the most prestigious opera houses, such as La Scala Opera House in Milan and Santa Cecilia National Academy in Rome.

The company has also committed to supporting the world of art by sponsoring the "Dante. The Vision of Art" exhibition in Forlì (Central Italy), as part of events celebrating the 700th anniversary of the poet's death.

And, needless to say, the spotlight is also on Sassuolo Football Club, surveying projects aimed at supporting both female and male players, as well as youth teams.

Enjoy your reading.

# SUMMARY












**Cover story**
This issue encloses a special section on Mapei solutions for bituminous road surfaces and plenty of projects where these solutions were used.


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Mapei Kft., Mapei Ukraine, Mapei SK sro, Mapei Brasil, Master Group Sport, Sassuolo Calcio, Polyglass SpA., Mapei Croatia d.o.o., Polyglass USA, Alex Celli, Polyglass SpA, Giancarlo Ciotoli, Musei San Domenico di Forlì, Wilma Malucelli, Teatro alla Scala, Accademia Nazionale di Santa Cecilia, Orchestra Sinfonica Giuseppe Verdi, Mapei Sport Research Centre

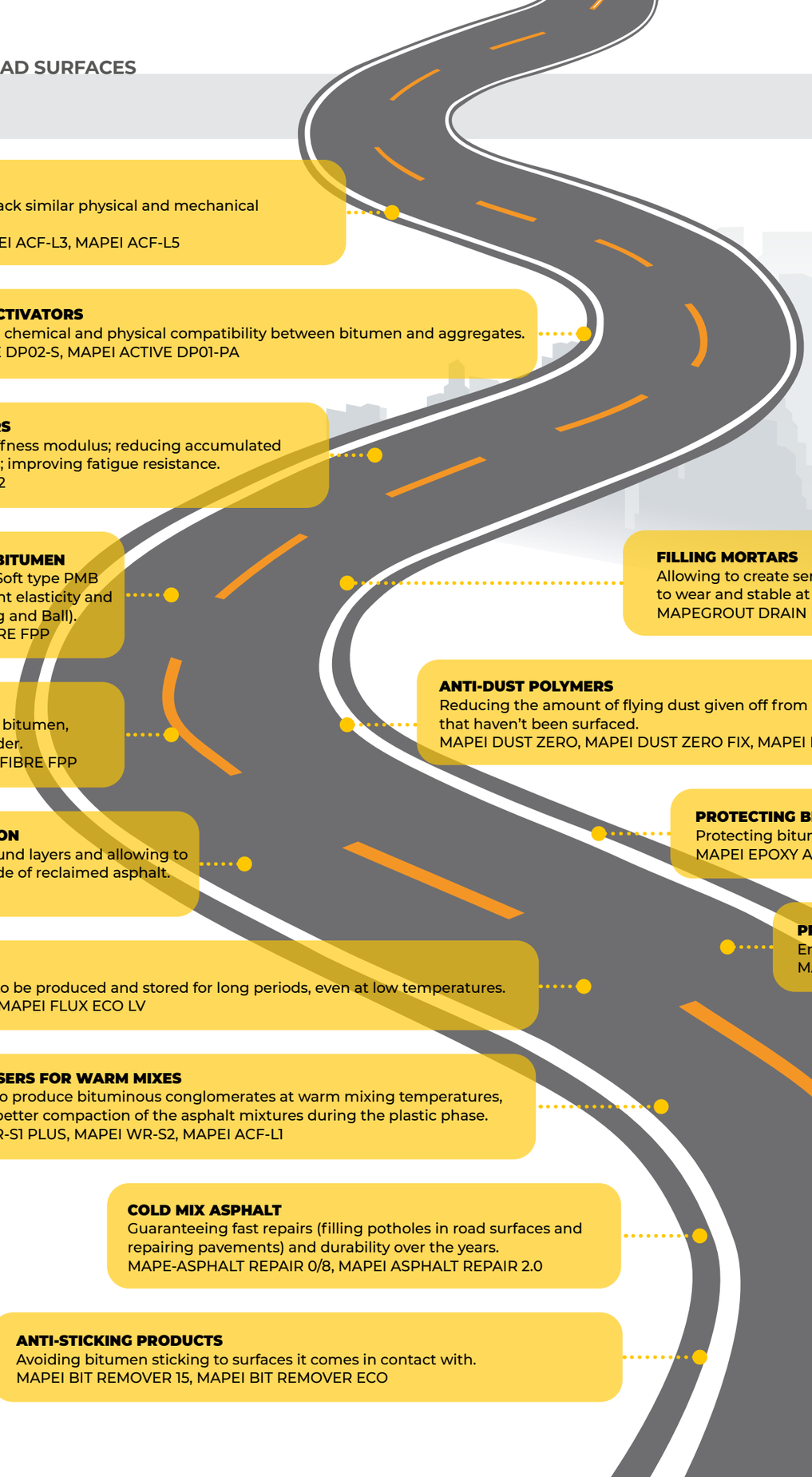
# INNOVATION ON THE ROAD

An efficient and sustainable transport system is important for connecting different regions and countries: it brings together people and markets contributing to economic growth. Roads play a key role because a considerable share of both passenger and goods traffic travels by road. According to Eurostat, 76.7% of all goods transport within the European Union in 2017 was by road, while 92% of passenger transport within the European Union was by cars and buses. In Europe, as is the case in many countries worldwide, plenty of road infrastructure is currently being built, while regular, efficient maintenance work on existing structures is becoming increasingly important. Lack of such maintenance is both a medium/long-term risk factor for the road network.

This is the framework within which Mapei is marketing its new line of products for bituminous road surfaces, specifically designed for the road construction industry: products devised in its Research & Development Laboratories based on a synergy of different skills available within the company and developed along the lines of durability and sustainability. These new products will be presented over the following pages, together with some of the main building projects for which Mapei has supplied products and on-site assistance.

# Road surfaces: a new product line by Mapei

## A COMPLETE RANGE FOR ALL BITUMEN TREATMENT REQUIREMENTS



**REGENERATORS FOR HOT MIXES**
Regenerating oxidised bitumen to give back similar physical and mechanical characteristics of the original bitumen.
MAPEI ACF-L2, MAPEI ACF-R200 LV, MAPEI ACF-L3, MAPEI ACF-L5

**ADHESION ACTIVATORS**
Improving the chemical and physical compatibility between bitumen and aggregates.
MAPEI ACTIVE DP02-S, MAPEI ACTIVE DP01-PA

**CONGLOMERATE MODIFYING POLYMERS**
Increasing mechanical properties and stiffness modulus; reducing accumulated and permanent deformation due to loads; improving fatigue resistance.
MAPEPLAST PAVI-01, MAPEPLAST PAVI-02

**ELASTOMERIC POLYMERS TO MODIFY BITUMEN**
Allowing the production of Medium and Soft type PMB (polymer modified bitumen) with excellent elasticity and improved levels of viscosity and R&B (Ring and Ball).
MAPEI E-SBC 1, MAPEI E-SBC 2, MAPEFIBRE FPP

**STABILISING FIBRES**
Stabilising and thickening admixtures for bitumen, reducing backflow of the bituminous binder.
MAPEFIBRE FPC, MAPEFIBRE FPV, MAPEFIBRE FPP

**COLD STABILISATION AND REGENERATION**
Improving the mechanical strengths of bound layers and allowing to regenerate cold-recycled base courses made of reclaimed asphalt.
MAPEI COLDPAV 1, MAPEI COLDPAV 2

**FLUX OILS**
Allowing plastic asphalt mixtures to be produced and stored for long periods, even at low temperatures.
MAPEI FLUX 15, MAPEI FLUX ECO, MAPEI FLUX ECO LV

**PLASTICISERS FOR WARM MIXES**
Allowing to produce bituminous conglomerates at warm mixing temperatures, enabling better compaction of the asphalt mixtures during the plastic phase.
MAPEI WR-S1 PLUS, MAPEI WR-S2, MAPEI ACF-L1

**COLD MIX ASPHALT**
Guaranteeing fast repairs (filling potholes in road surfaces and repairing pavements) and durability over the years.
MAPE-ASPHALT REPAIR 0/8, MAPEI ASPHALT REPAIR 2.0

**ANTI-STICKING PRODUCTS**
Avoiding bitumen sticking to surfaces it comes in contact with.
MAPEI BIT REMOVER 15, MAPEI BIT REMOVER ECO

**FILLING MORTARS**
Allowing to create semi-flexible floors with high mechanical properties, highly resistant to wear and stable at high temperatures, avoiding the use of expansion joints.
MAPEGROUT DRAIN FILL, MAPEGROUT DRAIN FILL NV

**ANTI-DUST POLYMERS**
Reducing the amount of flying dust given off from roads and areas that haven't been surfaced.
MAPEI DUST ZERO, MAPEI DUST ZERO FIX, MAPEI DUST ZERO SYNTH

**PROTECTING BITUMINOUS CONGLOMERATE SURFACES**
Protecting bituminous conglomerates against kerosene attack
MAPEI EPOXY AVIO

**PRODUCTS FOR BITUMINOUS EMULSIONS**
Emulsifiers and additives for rapid, medium and slow setting bituminous emulsions
MAPEI EMULS P, MAPEI EM-L2, MAPEI EM-Q4, MAPEI EM-Q5, MAPELATEX CBR, MAPEI EM STABILIZER

**REDUCTION OF UNPLEASANT ODOURS**
Reducing the level of odour given off by hot bituminous conglomerates during production, transportation and application.
MAPEI BIT-OD-STOP

**EASY-FLOW MORTARS**
Repairing concrete and fixing inspection shafts, manholes and urban design elements.
MAPEGROUT SV

**POWDERED COLORANTS**
Colouring concrete and mortars.
MAPECOLOR PIGMENT

**Keyword**

**BITUMEN**
Bitumen is a hydrocarbon binder - the last fraction of the oil distillation process - which, when used in combination with aggregates, forms the bituminous conglomerate commonly used for road layers.

# Research: our driving force

INTERVIEW WITH GILBERTO DEL ZOPPO, ROAD ENGINEERING LINE, R&D, MAPEI SPA

**The Road Engineering product line is Mapei's eighteenth dedicated line. Why has this new line been created? What areas of application do you operate in?**
This new line of technologies and solutions for bitumen conglomerates completes what, for Mapei, was already a comprehensive, well-structured range of solutions for the building and infrastructure sectors. However, since we have specific knowledge and expertise within the company, it was decided to explore this potential.
We create products and solutions for anything concerning the world of bituminous conglomerates, which is widely used not only in large-scale projects such as airports and motorways, but also for simple courtyards, areas of paving in historic town centres and local and provincial roads, providing our support from the design stage right up to the application stage.

**Is this product line also available through the Mapei Group's subsidiaries overseas?**
At the moment we are supplying our technologies to a number of countries and training our personnel at various subsidiaries in order to rapidly expand the market for our line of admixtures. Also, we are using local production facilities in different countries to be more competitive and respond more quickly to meet market demand.

**We are committed to using raw materials with low environmental impact**

**The products for the bituminous paving line were developed in the Research & Development laboratories: how important is research in this sector? Which are the most innovative technologies offered by Mapei?**
Research is our driving force: and it is from the research work that come up the development of our products, the answer to our clients' problems and new solutions for the entire sector. Our most advanced technologies at the moment are the thermostable ACFs (Functional Chemical Admixtures) containing a high percentage of renewable raw materials, such as ACF-L3 and L5, which allow a high amount of RAP (Reclaimed Asphalt Pavement) to be used in conglomerate, or the new stabilizers for bituminous emulsions that prevent separation during storage. But the really innovative technologies are those we are currently working on which should be released shortly, such as a family of biodegradable adhesion promoters and ACFs.

**All around the world, roads are in an increasingly poor state and the demand for remedial work is far greater than the need for new structures. What is Mapei proposing for restoration work on roads that have become badly deteriorated?**
MAPE-ASPHALT REPAIR 0/8, for example, is hygro-hardening asphalt we already sell and is used to carry out permanent repairs to potholes. We are currently working on solutions that are even more technologically advanced and cost-effective, as well as being eco-friendly.

**Mapei has always taken great interest in environmental sustainability and the health and safety of operators. How are you demonstrating this commitment in the bituminous paving sector?**
One of the constants we always take into consideration when developing our products is the use of raw materi-

# SUSTAINABILITY on the ROAD

MAPEI IS TAKING UP THE CHALLENGE OF CIRCULARITY IN THIS SECTOR, TOO, IN PARTNERSHIP WITH UNIVERSITIES AND RESEARCH CENTRES

When I was first introduced to the Road Engineering line, I would never have thought of associating sustainability with this range of products, but now, about one year later, this is increasingly the focus of our attention.
In my mind the road building industry was the least "sustainable" thing imaginable: watching roads being laid never really gives you an idea of how "green" this industry can be.
And yet my colleagues working in the Road Engineering department did not take long to persuade me that circularity and sustainability could move hand-in-hand with their own field of expertise: upon learning how Mapei ACF admixtures allow wear coarse surfaces destined for landfill to be reused for making new bituminous conglomerates, we soon realised we had to focus on the significant contribution these new admixtures make to the circular economy.
MAPEI ACF-L1, ACF-L2 and ACF-L3 admixtures for making new bituminous conglomerates can incorporate notable amounts of Reclaimed Asphalt Pavement (RAP), restoring the maltenes lost from oxidised-aged bitumen.
The environmental benefits of these products are obvious: the wear fraction does not need to be dumped (causing extremely high environmental impact) and can be revitalised in the form of a new bituminous conglomerate.
We wanted to gauge the environmental benefits of using ACFs by LCA (Life Cycle Assessment) methodology, which allows to measure the environmental impacts of a product or system throughout its whole life cycle.
The standard LCA methodology allowed us to compare the environmental impacts caused by manufacturing asphalt containing only virgin material with asphalt containing 15% RAP and asphalt containing 40% RAP: ACF admixtures promote the use of a high percentage of RAP.
To give even greater impetus to our study, we also involved Assolombarda's (the Association of companies operating in the Metropolitan City of Milan and in the provinces of Lodi, Monza and Brianza, Pavia) Green Economy Network in partnership with GEO (Green Economy Observatory) of the IEFE (Bocconi University), which at that time was promoting the CERCA project (Circular Economy as a Competitive Resource for Businesses), aimed at identifying and measuring the approach to the circular economy implemented by businesses.
This meant the LCA study was carried out simultaneously by our own

**Mapei admixtures guarantee significant environmental benefits. Materials destined for landfill are reused in new bituminous conglomerate**

als that have a low impact on the environment, such as those of plant origin or secondary raw materials, and aiming to reduce the use of hazardous substances to a minimum to help safeguard not only the environment, but also the health of operators.

**Issues such as waste and recycling are important for this sector too, particularly the handling, treatment and re-use of recycled bituminous conglomerate. What is Mapei proposing?**
We are developing technologies that extend the service life of paving, such as antioxidants for the bitumen; technologies that help reduce the rate of deterioration, such as waterproof and permanent repairs; and others that limit the need or frequency of interventions, such as bituminous membranes to stop cracks coming upwards from the underlying layers. And as far as the mountains of asphalt chippings to be recycled are concerned, our ACFs allow an increasingly higher percentage to be used in new layers of bituminous conglomerate.

**Another particularly important topic for Mapei regards durability: how can Mapei technology help create more durable paving?**
To extend the service life of paving you just need to limit oxidation of the binder, improve adhesion to the aggregates and make the paving more resistant to heavier fatigue cycles. Mapei has admixtures and polymers available which, if used correctly, can help to achieve all these things.

**What are your team's main strong points?**

> We are able to count on all the Group's R&D centres

We are able to count not only on the knowledge of people who are highly experienced in this specific sector, and by that I mean our Italian and foreign colleagues and consultants; but also on the experience and knowledge of colleagues from all the other Mapei research groups. Specific examples of this are the synergic collaborations that have been created between our group and the polymer synthesis team at Vinavil (a subsidiary of the Mapei Group) and between the epoxy resin line and the polyurethane products line at Mapei SpA's R&D centre. Another of our strong points is the relationship we create with our clients when working together on site, which often becomes a partnership in every sense of the word.

Environmental Sustainability team using GaBi software and also the Bocconi University team of researchers using a different kind of software (SimaPro). In this way, by assessing the environmental benefits of using RAP, we were able to compare the results obtained using different databanks and types of software.
The whole lifecycle of asphalt was examined in the environmental study, starting with the impacts caused by raw materials and their transportation/manufacture and also including the laying of asphalt on local roads, main/secondary inner-city roads, and motorways.
The calculations showed a net saving in terms of Kg $CO_2$eq from using high percentages of RAP, thanks to the use of ACF admixtures: when constructing a 1 km stretch of a three-lane motorway working along the lines of the circular economy, the savings in terms of $CO_2$ compared to conventional methods are extremely high and equivalent to 187,354 kg $CO_2$ when opting the circular method with 40% RAP, corresponding to an annual absorption of approximately 2.417 plants or the amount of $CO_2$ emissions given off by a car travelling 1,623,518 km (equal to 2799 trips from Milan to Rome).
This project helped Mapei win Confindustria's (Confederation of Italian manufacturing and service companies) prize for the "Best Performer in a Circular Economy 2019-2020".
But the challenges associated with circularity do not stop here. The Mapei Road Engineering team is, in fact, continuing its research into boosting sustainability-circularity with the help of their products.
The working partnership with Iren will see us using polymers taken from plastic waste to create high-performance asphalts, such as those used for building runways in airports.
Of course, all these environmental benefits and claims will be backed up by studies carried out by the Mapei Sustainability team to measure the real environmental benefits and avoid any danger of 'green washing'.

**Mikaela Decio.** Corporate Environmental Sustainability, Mapei SpA (Italy)

# Technological innovation and the use of recycled products

WE SPOKE WITH ALEX CELLI, PRODUCTION MANAGER AT PESARESI, A MEMBER COMPANY OF SITEB (ASSOCIAZIONE ITALIANA BITUME ASFALTO STRADE – ITALIAN ASSOCIATION FOR BITUMEN AND ASPHALT ROADS)

**Over the last 50 years, the road network in Italy has tripled whereas vehicle traffic is thirty times higher. How have technologies developed in order to cope with the constantly increasing volume of traffic?**
The bituminous conglomerate industry has changed considerably in recent decades. Great steps forward have been made in production techniques and in the type of materials used, and more attention is being paid to finer details as a result of consolidated knowhow.

> For quite a long time research has been focusing on mixes with a high content of RAP (Reclaimed Asphalt Pavement)

**In Italy, the use of polymer modified bitumen is still mainly relegated to the motorways and, when it is used, it is rarely for other applications than for porous bituminous conglomerates. Is it reasonable to limit its use only to this specific application? What are the characteristics of this type of bitumen in terms of performance, properties and durability?**
Modified bitumen is a part of the technological progress I mentioned previously and guarantees a higher level of durability to both loads and temperature variations (minimum and maximum seasonal values).
If its use were more widespread, it would reduce the frequency of road maintenance in return for a small initial contribution.

**Italy improved its performance for recycling road paving, going from 20% in 2014 to 25% in 2018 of reclaimed asphalt pavement (RAP) in four years, but it is still quite a way behind compared with the other major European countries (where the average is 60%). What is putting a brake on the development of recycled material?**
The use of recycled materials is mistakenly perceived as worsening the quality of bituminous conglomerate. Also, the main reference technical specifications limit their use to a maximum of 30%. For quite a long time, however, research has been focusing on mixes with a high content of RAP and this know-how has been partially transferred over to manufacturers. A further limitation is due to the age of the production plants located around the country. Having said that, we are heading in the right direction and Italy is moving quickly to catch up with the other countries.

**The production of bitumen nowadays allows us to safeguard the environment more than before and to reduce costs, thanks to the reduction of $CO_2$ emissions during the production process and to the way bitumen is transported and applied. What is the outlook for the sector as far as sustainability is concerned?**
There is enormous potential. We just have to think about the admixtures for Warm Mixes, for example, which allow temperatures to be reduced during production, which means lower emissions. However, in this case everyone needs to make more effort to raise the awareness of all those operating in the sector that are still hanging on to old traditions and haven't understood the importance of sustainability.

**Bitumen has now become a possible means of disposing of waste materials from many industrial processes. Which materials can be recycled?**
Scientific research into recycling has been pushing in every direction, proposing the use of a large variety of materials in bitumen. However, we have to be careful. If the use of a high amount of RAP and other reclaimed products, such as blast-furnace slag or plastic polymers, has becomes consolidated practice, other reclaimed products need to be studied very carefully before being used. Otherwise, the risk is that, in the future, the quality of the chippings materials themselves could become increasingly lower.

# Agreement between Mapei and Iren for the use of recycled polymers

## INNOVATIVE TECHNOLOGIES FOR MORE DURABLE AND SUSTAINABLE ROAD PAVING


**LEFT.** Marco Squinzi, CEO of the Mapei Group, and Massimiliano Bianco, CEO of Iren.
**RIGHT.** Thermoplastic polymers made from cutting-edge recycling processes: a new technology enabling the production of bituminous conglomerate and, as a result, longer-lasting, sustainable road surfaces.

Longer-lasting sustainable road paving thanks to the use of thermoplastic polymers from innovative recycling processes.
The agreement signed recently between Mapei and Iren, one of the most important multiutility companies operating on the Italian market, is a virtuous example of a circular economy.
Mapei will use these technopolymers, jointly developed with Iren through I.blu – a recycling company that selects and recycles plastic wrapping materials from sorted waste – for the production of bituminous conglomerates for road layers.

According to the terms of the agreement, which for the first time sees a multiutility and a manufacturing company working together, Mapei has committed to producing bituminous conglomerates for road surfaces using technopolymers developed jointly with Iren through I.Blu.
An agreement that, once again, highlights Mapei's commitment to sustainability for the new line of products for bituminous paving too, where recycling already accounts for 40% of its total value.
"A circular economy also entails research into durability", said Marco Squinzi, Mapei Group's CEO, "And the use of cutting-edge technology to find long-lasting solutions to extend the life of both new and repaired structures must become a commitment that is shared by everyone in the building and infrastructure sector. The fact that this can be achieved by using secondary raw materials adds value to a project that aligns perfectly with Mapei's decision to make sustainability a cornerstone of the company's activities".

**Compared with a traditional road surface, the service life of a road surface with the same thickness containing these polymers can be extended by more than 50%, depending on actual service conditions.**

### Technopolymers for long-lasting paving

By adding thermoplastic polymers to bituminous conglomerates, road paving can be produced which is more resistant to service loads, variations in temperature and UV rays compared with traditional paving with the same thickness, thereby extending significantly the service life of paving and reducing the resources required to carry out maintenance work. This also leads to a lower rate of deterioration of road surfaces over time and a lower level of risk for users, especially cyclists and motorcyclists.
Compared with traditional road surfaces, the service life of a surface with the same thickness containing this new technology can be extended by more than 50%, depending on actual service conditions.
Joint tests, carried out with the support of the Mapei Road Engineering Laboratory at Milan Polytechnic, have allowed formulations to be identified which, thanks to these admixtures, have led to the development of longer-lasting, sustainable bituminous conglomerates suitable for use on roads and motorways as well as in industrial areas, airports and logistics and commercial hubs.

# Multicircle Economy: the new frontier in sustainable business

## WE SPOKE WITH MASSIMILIANO BIANCO, CEO OF IREN

**What does a circular economy mean for Iren?**
For the most recent industrial plan taking us to 2025, we came up with the term "Multicircle Economy", a new concept which surpasses the traditional term, circular economy. It underlines our multi-business approach, in which the different activities all work together towards a common target; a more responsible use of resources in terms of savings and recycling. A Multicircle Economy, therefore, represents our new, long-term industrial vision, with an integrated strategy of sustainable business development: in this particular context, giving new life to non-recyclable plastics for use in green industrial solutions to build infrastructures represents a concrete example of this strategy.

**Why did you choose Mapei as partner?**
Mapei and Iren share the same responsible approach to sustainability, highly focused on product and process innovation. Together, we have developed applications for our recycled polymers in the bituminous membranes sector and now – together – we are putting ourselves forward as candidates to improve the quality of road infrastructures by guaranteeing less maintenance, a more widespread use of chippings and, therefore, lower consumption of resources. For us, developing circular economy solutions means not only creating products similar to those from the so-called linear economy, but also developing innovative, sustainable products with superior performance properties.

**What are the future developments of this partnership?**
The common target is to make these solutions more widely adopted on both the Italian market – such as thanks to the increasingly widespread use of Minimum Environmental Criteria protocols for tendering purposes – and on the international market, where we have already worked together with Mapei on various infrastructure projects. And this is why we will be investing more on the development of our commercial sector, on training for our personnel and on research. We will be working together to identify new possible applications for the use of recycled plastics in high quality materials for the construction sector and infrastructures. And lastly, together we will evaluate further joint-ventures in the infrastructure sector and in Iren Group's projects on building efficiency to implement our vision of a Multicircle Economy even further.

## Bologna-Taranto (Italy)

# A14 MOTORWAY

### FROM MAPEI, MINERAL FIBRES FOR PERVIOUS PAVING TO REDUCE WATER SPRAY AND THE RISK OF AQUAPLANING

A lot has been done in the last few years to reduce the number of accidents caused by wet road surfaces, which can dramatically increase the risk of them occurring: apart from stretches of motorway running through mountainous areas, almost 82% of their surface is made from a continuous wearing course layer made from pervious bituminous conglomerate. In fact, if the traditional type of materials were used on motorways in mountainous areas, the ice would persist longer on the carriageway during winter. Pervious paving not only improves visibility by reducing the amount of water sprayed up from the road surface, it also reduces the risk of aquaplaning.
Mineral fibres are an essential component of bituminous conglomerates used to form pervious wearing course layers on roads. In fact, the presence of these fibres has a stabilising effect on the bituminous mix, that contains a high percentage of coarse gravel and very little sand, and prevents the binder from draining away, thereby guaranteeing more and better surface contact between the larger particles of aggregates. These micro-fibres may be made from cellulose, glass, acrylic, and sometimes from carbon.

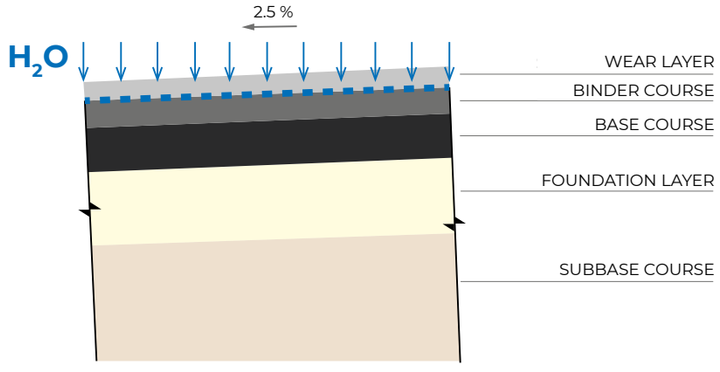



**FIG. 1.** Pervious paving on motorways is generally made from a foundation layer of stabilised granulated material or mixed cemented material, a base course of bituminous conglomerate, a binder course of bituminous conglomerate and a pervious wearing course of bituminous conglomerate (with 18-20% of voids). Any rainwater that passes through the pervious wearing course layer flows under the surface of the carriageway and follows the slope of the road to run off from the sides of the road.

**Refurbishment of the bituminous conglomerate for road surfaces**
This project included the refurbishment of stretches of bituminous conglomerate between locations 155+900 and 170+400 along the A14 Motorway as required by the management company of the motorway, Autostrade SpA.
The work was carried out by milling away the wearing, binder and base course layers of the old paving and then rebuilding the road using the same stratographic layout, except for the wearing layer, which in this case was made from pervious bituminous conglomerate. The total thickness of the paving renewed was of 24 cm, the top 4 cm of it made of pervious wearing course. The bituminous conglomerate mix used for the pervious layer is shown below (quantities required for 1000 kg of mix):

| | |
|---|---|
| Aggregates | 950 kg |
| Bitumen | 50 kg |
| Fibres | 2.85 kg (0.3% by weight of aggregates) |

The mix complied with the specifications prescribed in the Special Tender document issued by the client, particularly regarding the minimum percentage of voids in the bituminous conglomerate used to form the pervious wearing course layer.

**Cellulose and glass fibres by Mapei**
Mapei was involved in the construction of the pervious paving through the supply of MAPEFIBRE FPV glass-cellulose fibres with synthetic polymers specifically formulated for making open-grade bituminous conglomerate mixes characterised by a high percentage of voids.
It was necessary to use MAPEFIBRE FPV to compensate the irregularity of the granulometric curve, a typical characteristic of pervious bituminous conglomerate, and to significantly increase the bond between the aggregates and the adhesion of the bituminous film around the aggregates.
MAPEFIBRE FPV helps to form a thick, strong film around aggregates, thereby enabling a stable, reticular bond to be formed in the bituminous mix.
The polymers contained in the cellulose fibres also increase the plasticity of the bitumen, making the bituminous conglomerate easier to apply and reducing the risk of deformation when subjected to loads from traffic.
One of the most important properties of the fibres is their ability to stop the bitumen from draining away in mixes with a high percentage of voids.
Certain important reference specifications, such as those issued by the Milano Serravalle–Milano Tangenziali road management company for mortways in Northern Italy, specify that the drainage value must be lower than 0.2% according to EN 12697-18 (the Schellenberg method), which measures the loss in weight of bitumen in the tested mix.
Adding MAPEFIBRE FPV to the conglomerate meets the specified requirements, guaranteeing a stabilising effect and giving the bitumen a more viscous consistency that stop it draining away.
Adding MAPEFIBRE FPV also significantly improves Marshall stability and flow values in mixes, as well as their stiffness modulus.
The amount of MAPEFIBRE FPV required varies from 0.3% to 0.6% by the weight of aggregates. This amount, however, may vary after carrying out laboratory testing during the design phase of the mix.

**MAPEFIBRE FPV**

Glass-cellulose fibres with synthetic polymers for bituminous conglomerate

**FIND OUT MORE**

**TECHNICAL DATA**
**A14 Motorway,** Bologna-Taranto (Italy)
**Period of renovation:** 2020
**Period of the Mapei intervention:** 2020

**Intervention by Mapei:** supplying fibres for the bituminous conglomerate used for the road surfaces
**Client:** Autostrade per l'Italia SpA
**Design:** Autostrade SpA

**Contractor:** F.lli Pesaresi Giuseppe SpA
**Mapei coordinators:** Francesco Cerutti, Francesco Giudici, and Gilberto Del Zoppo, Mapei SpA (Italy)

**MAPEI PRODUCTS**
Fibres for bituminous conglomerate:
Mapefibre FPV

For further info on products see mapei.com


**Tirana (Albania)**

# Tirana International Airport Nënë Tereza

MAPEI TECHNOLOGY DEPLOYED FOR THE REFURBISHMENT OF THE RUNWAYS, TAXIWAYS, AND APRONS

## Problems and solutions

To upgrade the paving at Tirana airport, Mapei supplied elastomeric polymers to produce polymer-modified bitumen. This enabled the bitumen to be produced in the quantities required, directly at the production plant, and to obtain binders with excellent elasticity and stability over time using normal, locally-sourced bitumen as the base material.

Airport paving is designed to provide adequate support for loads transmitted by aircrafts and, at the same time, to have a surface that is as solid and even as possible and resistant to wear.

Deterioration of paving on runways, entry and exit areas of runways, taxiways and aprons has become a major problem due to an increase in air traffic, ageing of materials and, in some cases, insufficient or poor maintenance.

The level of air traffic at Tirana International airport Nënë Tereza has increased considerably in recent years as a result of there being more connections with other European and non-European cities.

An increase of the number of aircrafts in circulation has led to an increase in the loads acting on the paving of the airport.

All this underpins the importance of carrying out periodical maintenance work to extend the service life of paving and to prevent the risk of surfaces losing their efficiency over the years.

**Upgrade and refurbishment of the runways and taxiing areas**

Tirana International Airport (TIA) launched an important project called "Airfield 2020", which consists of refurbishing the runways and taxiing areas on the ground used by the aircrafts.

Apart from these areas, other work was carried out to partially restore the paving for the aprons used for disembarking and boarding passengers, loading and unloading goods, carrying out refuelling and parking and maintaining aircrafts.

The "Airfield 2020" project was split into different phases. The first phase, which has now been completed, was the complete reconstruction of the paving for taxiways W and B, for a total length of 1.5 km and a width of 45 m, in compliance with international standards.

The first phase also included the complete refurbishment of certain areas of the bituminous conglomerate for the aprons.

The second phase of the project is a complete rebuild of the paving for the runways.

The first part of the project included the following work on the taxiways:

- demolition of the old paving;
- removal of the subbase course of the paving;
- digging out new foundations;
- positioning new drainage channels;
- rebuilding new paving;
- installation of new ground lighting.

The work carried out to upgrade the paving included refurbishing the high modulus binder layer (thickness 7 cm) and the hard-modified wearing course layer (thickness 5 cm).

The design of the stratigraphic layout of the paving had the following layers:

- Cement stabilized foundation layer
- Bituminous conglomerate base course made from traditional 50/70 bitumen and aggregates up to 32 mm in diameter (thickness: 10 cm);
- A second bituminous conglomerate base course made from traditional 50/70 bitumen and aggregates up to 22 in mm in diameter (thickness 8 cm);
- Bituminous conglomerate binder layer made from modified 25/55-60 bitumen and aggregates up to 22 mm in diameter (thickness 7 cm);
- Bituminous conglomerate wearing course layer made from modified 45/80-65 bitumen and aggregates up to 16 mm in diameter (thickness 5 cm).

For more details on the technical specifications of the modified bitumen used for the binder and wearing layers, below is an extract of the tender document with the required properties and characteristics.

| Characteristics | Test method according to | Unit | Requirement |
|---|---|---|---|
| Penetration at 25°C | EN 1426 | 0.1 dmm | 25-55 |
| Softening point | EN 1427 | °C | ≥60 |
| Force ductility | EN 13589, EN 13703 | J/cm² | ≥3 (10°C) |
| Fraas breaking point | EN 12593 | °C | ≤-10 |
| Resistance to hardening resistance | | | |
| Change of mass | EN 12607-1 | % | ≤0.5 |
| Increase of softening point, severity 1 | EN 1427 | °C | ≤10 |
| Elastic recovery at 25°C | EN 13398 | % | ≥50 |
| Storage stability | EN 13399 | | |
| Difference in softening point | EN 1427 | °C | ≤5 |
| Flash point | EN 12592 | °C | ≥250 |

**TABLE 1.** Requirements of the polymer-modified bitumen for the binder layer (PMB 25/55-60)

| Characteristics | Test method according to | Unit | Requirement |
|---|---|---|---|
| Penetration at 25°C | EN 1426 | 0.1 dmm | 45-80 |
| Softening point | EN 1427 | °C | ≥65 |
| Force ductility | EN 13589, EN 13703 | J/cm² | ≥3 (10° C) |
| Fraas breaking point | EN 12593 | °C | ≤-18 |
| Resistance to hardening resistance | | | |
| Change of mass | EN 12607-1 | % | ≤0,5 |
| Increase of softening point, severity 1 | EN 1427 | °C | ≤10 |
| Elastic recovery at 25°C | EN 13398 | % | ≥80 |
| Storage stability | EN 13399 | | |
| Difference in softening point | EN 1427 | °C | ≤5 |
| Flash point | EN 12592 | °C | ≥250 |

**TABLE 2.** Requirements of the polymer-modified bitumen for the wear layer (PMB 45/80-65)


**LEFT.** Spreading and compacting the wear layer for the taxiways made up of bitumen modified with MAPEI E-SBC 2.
**RIGHT.** Spreading and compacting the binder course for the taxiways made up of bitumen modified with MAPEI E-SBC 2.

**Bitumen-modifying polymers**
Right from the beginning of the project and then throughout the carrying out of validation tests, Mapei and its Research & Development Laboratories worked in close partnership with the Euroteorema Group, a leading contractor of bituminous conglomerate road surfaces, and with the STS Mobile Laboratory. Mapei supplied special polymers to transform traditional bitumen into modified bitumen, as per the Technical Specifications, to be used as a binder in the binder layer (PMB Hard) and wearing course layer (High Modulus PMB). In the first part of the project, Mapei supplied MAPEI E-SBC2, a special mixture of elastomeric polymers to modify bitumen for the binder and wearing course layers. This ensured the following advantages:

- It was possible to make modified bitumen meeting the requirements of the technical specifications directly at the production facility, without having to use a colloidal mill, rather than importing the modified bitumen from abroad.
- No need to store the modified bitumen for long periods, which would have led to the bitumen oxidation and a partial loss of its properties. It was possible to produce the amount needed as and when required.
- The binder was produced using normal, locally sourced bitumen and featured excellent elasticity and stability over time..

Right are the results of tests carried out on samples taken on site of hard and high-modulus modified bitumen.

| Type of test | Unit | Result | Standard |
|---|---|---|---|
| Penetration at 25°C | dmm | 48 | EN 1426 |
| Softening point | °C | 72.2 | EN 1427 |
| Fraas breaking point | °C | -21 | EN 12593 |
| Dynamic viscosity at 160°C (SPDL 21) | Pa.s | 0.973 | EN 13702-2 |
| Elastic recovery at 25°C | % | 89 | EN 13398 |
| Flash point | °C | 288 | EN ISO 2592 |
| Fire point | °C | 310 | EN ISO 2592 |
| Force ductility | J/cm² | 4.5 | EN 13589<br>EN 13703 |
| **Stability during storage (3 days at 180°C) EN 13399** | | | |
| Upper softening point | °C | 74.8 | EN 1427 |
| Lower softening point | °C | 75.8 | |
| **Resistance to hardening EN 12607-1** | | | |
| Increase of softening point | °C | 4.0 | EN 1427 |
| Residual penetration | % | 74 | EN 1426 |

**TABLE 3.** Test results for sample of high-modulus bitumen taken on 28/1/2020 (PMB 45/80-65 for the wearing course layer)

| Type of test | Unit | Result | Standard |
|---|---|---|---|
| Penetration at 25°C | dmm | 34 | EN 1426 |
| Softening point | °C | 67.4 | EN 1427 |
| Fraas breaking point | °C | -21 | EN 12593 |
| Dynamic viscosity at 160°C (SPDL 21) | Pa.s | 0.554 | EN 13702-2 |
| Elastic Recovery at 25°C | % | 85 | EN 13398 |
| Flash point | °C | 282 | EN ISO 2592 |
| Fire point | °C | 308 | EN ISO 2592 |
| | J/cm² | 3.4 | EN 13589<br>EN 13703 |
| **Stability during storage (3 days at 180°C) EN 1339** | | | |
| Upper softening point | °C | 71.8 | EN 1427 |
| Lower softening point | °C | 70.4 | |
| **Resistance to hardening EN 12607-1** | | | |
| Increase of softening point | °C | 4.2 | EN 1427 |
| Residual penetration | % | 70 | EN 1426 |

**TABLE 4.** Test results for sample of hard bitumen taken on 27/1/2020 (PMB 25/55-60 for the binder layer)

## POLYMERS FOR MODIFIED BITUMEN

Using modified bitumen allows you to achieve numerous advantages when constructing flexible paving for motorways and airports. Improving the viscoelastic properties of bituminous conglomerate and the hardness of paving leads to a considerable reduction in the total cost of its service life. Modified bitumen is made by adding special polymer modifiers so that it meets requirements such as resistance at low and high service temperatures and an increase in the elastic recovery, which makes paving less susceptible to cracking. These polymers have a positive effect on many other properties of traditional bitumen, such as drastically reducing the risk of oxidation, one of the most common problems that limits the service life of paving.
The advantages of using modified bitumen in bituminous conglomerate may be summarised as follows:

- less susceptible to daily and seasonal temperature variations
- higher resistance to deformation
- higher resistance to ageing
- higher resistance to fatigue
- higher level of adhesion between aggregates and binder
- prevents cracking phenomenon

Modified bitumen technology has been around for some time and is available from large petrochemical companies where this type of bitumen is produced on an industrial scale.
Only more recently, however, have special polymers been developed, which are added to traditional bitumen in relatively simple production plants. This has made possible to make modified bitumen even when there is no access to a special production plant with a colloidal mill.
Mapei has developed a series of special polymers which are produced by means of a special chemical process. This process combines different molecules of selected elastomers in granulated powder form, combined with recycled rubber and other specific raw materials, so that they disperse very efficiently throughout the virgin bitumen and optimise the performance properties of the resulting polymer-modified bitumen.
Mapei technology enables modified bitumen to be produced according to specific characteristics and properties required to comply with the most severe technical specifications. What is more, this technology may even be applied in geographical areas that are difficult to reach and at a relatively low cost for modifying the production equipment needed for the process.

**MAPEI E-SBC2**

Mixture of elastomeric polymers to modify bitumen

**FIND OUT MORE**

**TECHNICAL DATA**
**Tirana International Airport (TIA) Nënë Tereza,** Tirana (Albania)
**Period of renovation:** 2019-2020
**Period of the Mapei intervention:** 2020

**Intervention by Mapei:** supplying polymers for modified bitumen
**Client:** TIA, Fllohe Vojka, Technical Director
**Contractor:** Euroteorema Group, Giovanni Pascale (Turin, Italy)

**Consultant for the contractor:** STS Mobile Lab, Stefano Tattolo (Ancona, Italy)
**Works direction**: Infrakonsult Sh.p.k, Sokol Metoja (Tirana-Albania)
**Mapei coordinators**: Francesco Cerutti, Francesco Giudici, and Gilberto Del Zoppo, Mapei SpA (Italy)

**MAPEI PRODUCTS**
Elastomeric polymers: Mapei E-SBC2
mapei.com

## Venice (Italy)

# Marco Polo Airport

UPGRADING AND REGULATORY COMPLIANCE WORK ON THE AIRPORT INFRASTRUCTURES TO HANDLE THE EXPECTED INCREASE IN AIR TRAFFIC

### Problems and solutions

The runways at Marco Polo airport in Venice were extended and upgraded. Using Mapei admixtures for the bituminous conglomerate meant that a higher amount of RAP (Reclaimed Asphalt Pavement) could be used and a better bond was created between the binder, made from virgin and recycled bitumen, and the aggregates.

Between 2018 and 2020, Marco Polo International Airport in Venice underwent a series of major works to increase its operating capacity.
Work was carried out on both the main and secondary runways and new surfacing was installed on the aprons and taxiways.
Work included the following in particular:

- upgrade of the aircraft infrastructures (runways and taxiways) and new surfacing;
- new exit/entrance areas to enable aircraft to move away from the main runway more quickly to increase overall operating capacity;
- upgrade of the safety zones at the ends of the runways;
- upgrade of the drainage systems to discharge rainwater more efficiently.

The secondary runway was extended from 2,780 m to 3,300 m (the same length as the main runway) to improve safety levels and generate more efficient taxiing operations, thereby increasing the overall capacity of the system.
The upgrading work included reconstruction of the entire superstructure.
Other works included upgrading the plant systems and increasing the safety features for both runways, particularly the Aeronautical Ground Lighting and runway incursion prevention monitoring systems, to increase safety standards and manage the expected increase in traffic more efficiently, especially in conditions of poor visibility.

**From Mapei: specific products for bituminous conglomerate**

To upgrade the surfacing of the runways, a deep channel was milled out and then rebuilt along the central strip of the runways, while in the remaining areas of the runways, the wear layer only was removed and a new one was installed.

**ABOVE.** Upgrading work was carried out on both the main and secondary runways and new surfacing was installed on the aprons and taxiways.

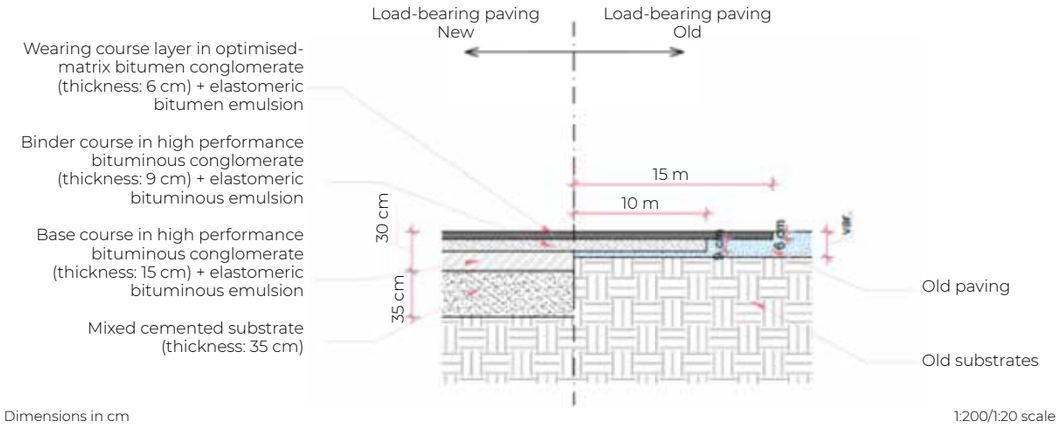
For this project, Mapei supplied products specifically designed for the bituminous binder and base course layers for around 400,000 m² of new surfacing for the aprons, taxiing areas, entrance/exit areas of the runways and the runways, as well as technical support during the mix design phase and application phase of the mixes.
Going into detail, the following products were supplied:

- MAPEI ACF-L2 regenerating liquid admixture for bitumen for the base course and binder layers;
- MAPEPLAST PAVI 02 polymer used in the production of modified bituminous conglomerate for the base course and binder layers.

The benefits of using these admixtures may be summarised as follows:

- Adding MAPEI ACF-L2 allowed high amounts of RAP (Reclaimed Asphalt Pavement) to be used in the base course and binder layers. MAPEI ACF-L2 significantly improves the rheological properties of the bitumen in the RAP by reintegrating its maltene component (an oily resin present in the original bitumen) consumed by oxidisation and ageing processes. MAPEI ACF-L2 also improved adhesion of both the virgin and regenerated bituminous agglomerate, thanks to its special formulation containing synthetic adhesion promoters.
- The use of MAPEPLAST PAVI 02, which was used in addition to MAPEI ACF-L2 in the base course and binder layers, helped to improve the adhesion of the virgin and recycled bituminous components to the aggregates.
Adding MAPEPLAST PAVI 02 to the bituminous conglomerate also increased the shear modulus of the conglomerate and the benefit of this admixture is that it significantly improves the resistance of the surfacing to fatigue and permanent deformation (or rutting, which forms along the trajectory of the wheels of aircraft).

**TYPICAL CROSS-SECTION OF THE SURFACING IN THE AIRPORT**




**1.** Application of the base course layer containing MAPEI ACF-L2 and MAPEPLAST PAVI 02 to improve its mechanical properties along the secondary runway.
**2.** Application of the binder layer containing MAPEI ACF-L2 and MAPEPLAST PAVI 02 to improve its mechanical properties in exit/entrance area A.

**MAPEI ACF-L2**

Regenerating liquid admixture for bitumen

**FIND OUT MORE**

**TECHNICAL DATA**
**Marco Polo airport,** Venice (Italy)
**Period of the renovation:** 2018-2020
**Period of the Mapei intervention:** 2019-2020
**Intervention by Mapei:** supplying admixtures and polymers to build bituminous road surfaces
**Client:** SAVE SpA
**Design:** Erre.Vi.A. Srl (Capogruppo), MCI Srl, Rocksoil Spa
**Main contractors:** Consorzio Gruppo ICM (Impresa Costruzioni Maltauro), Gruppo Gavio (Itinera)
**Road surfacing contractors:** Gruppo Grigolin, Gruppo Mosole
**Mapei coordinators:** Francesco Cerutti, Francesco Giudici, and Gilberto Del Zoppo, Mapei SpA (Italy)

**MAPEI PRODUCTS**
Admixtures for bituminous conglomerate: Mapei ACF-L2, Mapeplast PAVI 02

For further information on products: mapei.com

## Ciampino (Rome, Italy)

# G.B. Pastine International Airport

### A FILLER MORTAR WAS USED FOR THE GROUTED MACADAM TECHNOLOGY FOR THE NEW PAVING OF THE APRONS

G.B Pastine International Airport in Rome, named after Giovanni Battista Pastine, is located in the town of Ciampino, in an area south-east of the Italian capital, 15 km from the centre of Rome. The airport has a terminal for commercial flights and a second terminal for general flights, one runway, 92 aprons for aircraft and helicopters and a series of airside buildings (hangars) and landside support structures to ensure operations of the various business units run smoothly.

This airport is part of the Rome Airports organisation and is dedicated to passenger traffic, general aviation (private aircraft, particularly flights for state duties, humanitarian flights and the Civil Protection) and for aircraft used for military operations.

As part of the general investment plan recently issued by ADR (Aeroporti di Roma), between 2017 and 2018 the aprons and entry/exit routes for the runway were upgraded and the terminal for commercial flights was completely renovated. This article describes the project to upgrade aprons 400 and 500.

**The Grouted Macadam technology for new concrete slabs**

Paving is one of the most important infrastructure assets for an airport and, if paving on runways, taxiways or aprons deteriorates, operations involving aircraft can be affected and the safety of the aircraft themselves may be compromised.

In view of the above, it was vitally important to reconstruct the paving for the aprons to make sure that operations involving the movement of aircraft could be carried out in complete safety.

**1.** Application of MAPEGROUT DRAIN FILL NV to fill the voids in the open-grade bituminous conglomerate.
**2.** Finishing off the surface of the paving.

The old paving for the aprons was made up of 30-32 cm thick concrete slabs. This intervention included resurfacing the slabs with a new layer using Grouted Macadam technology, which was carried out in the following steps: the top 5 cm of the old, deteriorated concrete paving was milled off; a new layer consisting of "open-grade" Sintexcem bituminous conglomerate, with a 25% to 30% void matrix, supplied by Sintexcal SpA, was applied; the open-grade bituminous conglomerate was infilled with a special high-strength, polymer-modified cementitious mortar. I

t was decided to use an infilled, porous wearing course layer as an answer to the problem of slow-moving or parked heavy aircraft, typical of the operating conditions in airport aprons. This technology enables properties more typically found in concrete (high resistance to loads, rutting and punch loads) to be combined with application methods typical of bituminous surfaces, with the added benefit of almost completely eliminating the need for joints in the paving.

**A special cementitious mortar**

Mapei took part in this project by supplying a special, high-strength, polymer-modified filling mortar for semi-flexible floors, MAPEGROUT DRAIN FILL NV, which is specifically formulated to create layers of Grouted Macadam with high mechanical properties and physical characteristics.

The surfaces created with this technology can be opened to traffic within 24/36 hours from the application. This solution is particularly recommended for areas that have to withstand high static loads and punch loads.

MAPEGROUT DRAIN FILL NV has a super-plastic consistency and good pumpability, which makes it suitable for filling bituminous conglomerate up to 5 cm thick with between 25% and 30% of voids.

The structure created by this system, made up of open-grade bituminous conglomerate and MAPEGROUT DRAIN FILL NV, forms a layer with high mechanical properties and extremely high resistance to wear, sulphates and de-icing salts, with the added advantage of not having to include expansion joints.

MAPEGROUT DRAIN FILL NV high-strength mortar was prepared on site by mixing it with 23% of water in a continuous high-speed mixer and then applying it when the temperature of the open-grade bituminous conglomerate had dropped below 50 °C.

The mortar was applied over the bituminous conglomerate with a rubber hose so that it could work its way into the pores, and then spread over the surface with a rubber rake until the voids had been completely filled. In order to obtain a final finish with sufficient roughness, the surface of the mortar was finished off with a stiff broom.

**MAPEGROUT DRAIN FILL NV**

Filler mortar for semi-flexible floors

**FIND OUT MORE**

**TECHNICAL DATA**
**G.B. Pastine International airport,** Ciampino (Rome, Italy)
**Period of renovation:** 2017-2018
**Period of the Mapei intervention:** 2018
**Intervention by Mapei:** supplying a filler mortar for road surfaces
**Client:** AdR Roma
**Design:** Spea Engineering (Alessandro Allegrucci)
**Works direction:** Spea Engineering (L. Corti)
**Main contractor:** Pavimental SpA
**Mapei coordinators:** Francesco Cerutti, Francesco Giudici, and Gilberto Del Zoppo, Mapei SpA (Italy)

**MAPEI PRODUCTS**
Filling mortar for floors:
Mapegrout Drain Fill NV
mapei.com

**Rimini (Italy)**

# Sismondo Castle

## NEW PAVING IN MIXED, STABILISED GRANULAR MATERIAL FOR THE NEW PATHS AROUND THE CASTLE

As part of the restoration works on Piazza Malatesta and the area around Sismondo Castle in Rimini (central Italy) carried out from 2017 to 2019, new accessible areas of greenery and new pedestrian paths have been created to highlight the architectural relics unearthed during digs carried out around the ancient stronghold outside the castle.
During digs sections of original paving were also discovered dating back to the 19th century, which have been joined together by new pieces of paving that are resistant to vehicle and pedestrian traffic and atmospheric agents and clear-coloured to fit in stylistically with the older paved areas. The work has allowed local people to enjoy new lawns and greenery and make use of new cycle-pedestrian paths around the castle walls that are furnished with benches and historical-illustrative plaques.

**Mapei Coldpav technology for paving and road foundations**

As for the new public gardens and footpaths, Mapei supplied technical support and products to make the new paving in mixed, stabilised granular material. The mix used for the paving was made from granular limestone with maximum diameter of 20 mm and MAPEI COLDPAV 1, cement- free, fibre-reinforced, mineral hydraulic binder.
The MAPEI COLDPAV technology was developed by Mapei Research & Development laboratories, specifically for the treatment of soils and aggregates used for creating decorative stabilized soil paving or foundations for roads subjected to heavy loads when in service.
The special formulation of MAPEI COLDPAV 1 makes it suitable both in the presence of heterogeneous soils, recycled aggregates or aggregates of first use and R.A.P (Reclaimed Asphalt Pavement).
MAPEI COLDPAV 1 contains mineral additions with high pozzolanic activity (not coming from cement) that increase the durability of the final layer as well as the resistance to wash-out in the case of stabilised material.
In this specific project, MAPEI COLDPAV 1 made the treated material workable for up to 4 hours.
The higher ductility conferred from MAPEI COLPAV 1 to the final layer allows a more extended durability and resistance to fatigue.
In addition, the polypropylene fibers (dosage ≥ 0.1%) present in MAPEI COLDPAV 1 have a dimensional ratio of more than 600 and disperse very easily throughout the mix to improve the final mechanical characteristics of the treated layer.
The mix design used for the paving around Sismondo Castle was as follows:


1


2

**1.** Manual application to create the paving.
**2.** Soil compaction with vibrating plates.

| Material | Quantity (kg/m³) |
|---|---|
| Mixed quarried aggregate (max. diam. 20mm) | 1,700 |
| MAPEI COLDPAV 1 binder | 80 |
| Water | 90 |

By using this mix, the best possible mechanical properties were achieved and an optimum surface finish was obtained, in line with the technical specifications.
The mix was poured and spread over a sub-base consisting of a part in compacted soil and a part of a layer of lean concrete. The mix was applied manually and the soil was compacted with vibrating plates. The final thickness of the paving was 15 cm. To prevent the surface from crumbling, it was then treated with MAPEI DUST ZERO SINTH, a polymer latex product with a consolidating and anti- dust effect, which was applied by low-pressure, airless spray gun just after the surface had been compacted.

**MAPEI COLDPAV 1**

Fibre-reinforced hydraulic binder for stabilised soil paving.

**FIND OUT MORE**

**TECHNICAL DATA**
**Castel Sismondo footpaths,** Rimini (Italy)
**Period of redevelopment:** 2017-2020
**Period of the Mapei intervention:** 2019-2020
**Intervention by Mapei:** supplying a hydraulic binder to create the design mix for the new paving and a polymer latex product to prevent the surface from crumbling
**Owner:** Rimini City Council
**Works direction:** Gianni Arlotti
**Contractor:** Pesaresi Giuseppe SpA
**Mapei coordinators:** Francesco Cerutti, Francesco Giudici, Gilberto Del Zoppo, Fabrizio Maltoni, Mapei SpA (Italy)

**MAPEI PRODUCTS**
Mapei Coldpav 1, Mapei Dust Zero Sinth

For further information on products: mapei.com

# Safer toll booth lanes

## PROTECTION AND BETTER GRIP FOR CONCRETE AND ASPHALT SURFACES SUBJECT TO INTENSE TRAFFIC

The PLANISEAL TRAFFIC COAT EU system was developed in the Mapei R&D laboratories to meet the growing request from the market for a protection system with very high resistance to abrasion that can be applied on concrete and asphalt paving, excluded open grade type. For porous paving, a special version has been developed that has no effect on the permeability of road surfaces, called PLANISEAL TRAFFIC COAT EU ASPHALT.

With this system, the durability of paving is considerably improved, and it is also possible to modify and increase surface grip by dusting the surface with different grades of particles. The epoxy resin in the product allows areas that have been treated to be reopened to traffic very quickly, such as in the case of several test sites located in areas normally open to traffic, which were treated in the late evening or at night and then reopened to traffic, in some cases, after less than 6 hours. By choosing white aluminium oxide with particle sizes varying from 1 to 3 mm to dust the paving, these areas had a visibly different colour and the surface became much more resistant to abrasion.

The system was applied in various locations for a number of Local Authorities and Motorway Management organisations in Italy and abroad; its effect, especially when applied in and around toll booths, gave particularly pleasing results and reduced the risk of accidents due to longer braking distances in poor weather conditions. This problem often becomes more evident over time when, accumulation of motor oil left from vehicles impregnates the surface of untreated concrete and there is less grip due to rain or snow, that leads vehicles to have much less grip during braking.

PLANISEAL TRAFFIC COAT EU ASPHALT gives concrete an impermeable, protective surface finish, thereby increasing the durability of work carried out on roads and eliminating deterioration caused by gritting and freeze/thaw cycles in cold weather.

### THE EXPERT'S OPINION

"As part of the work on the toll booth lanes for T4 (the Frejus road tunnel), to reinforce the lanes I proposed the PLANISEAL TRAFFIC COAT EU ASPHALT + Bauxite system, which has given extremely positive results in terms of simplicity of application and overall effectiveness.

Working in synergy with Mapei Technical Services, a year after applying the system, we carried out a series of tests using the pendulum method (EN 13036-4), which is used to measure skid resistance of wet and/or dry surfaces.

The results of the tests showed that the initial surface roughness had been maintained, confirmation that this innovative proposal complies perfectly with the project specifications".

**Roberto Pozzallo.** Works Director, Musinet Engineering

# Quick, long-lasting road repairs

## EXTEND THE SERVICE LIFE AND IMPROVE SAFETY LEVELS OF PAVING WITH MAPE-ASPHALT REPAIR 0/8

To repair asphalt road surfaces quickly and remove holes and damages caused by freezing weather, without disrupting traffic, Mapei proposes MAPE-ASPHALT REPAIR 0/8, a product specifically developed for repairing the surface of motorways and busy trunk roads.

It is a one-component, solvent-free, pre-blended, cold-applied, reactive asphalt supplied ready to use. It hardens when in contact with air humidity and water, allowing road surfaces to be repaired quickly without interrupting the flow of traffic. MAPE-ASPHALT REPAIR 0/8 has the capacity to resist to highly intense loads when applied on solid, clean, well-compacted substrates. With MAPE-ASPHALT REPAIR 0/8, holes from 20 mm to 70 mm deep can be repaired in a single layer.

**Thanks to its special formulation, it may also be applied in rainy weather**

After application it doesn't stick to tyres, which means it doesn't break up and leave the granules along the road surface, a typical phenomenon occurring with traditional cold-applied asphalt. Also, after application, the passage of light to medium traffic makes it even more compact without damaging it.

Once hardened, the rheological properties of MAPE-ASPHALT REPAIR 0/8 remain stable, even when exposed to high temperatures. It is highly resistant to freezing weather and rain, with performance properties and a level of durability comparable with those of traditional hot-applied asphalt.

Thanks to its special formulation, it may also be applied in rainy weather, something which is not possible with traditional cold-applied asphalts.

The application of MAPE-ASPHALT REPAIR 0/8 also means that no further maintenance work is required, leading to much lower costs for road management companies and, above all, much safer driving conditions, by lowering the number of interventions carried out by maintenance teams, extending the service life of maintenance work and preventing accidents and injuries.

### MAPEGROUT SV SYSTEM FOR INSTALLING URBAN DESIGN ELEMENTS

Over the years, Mapei has developed an extensive family of products for installing elements and features such as road joints, inspection shafts, manholes, drain covers, road signs and all other types of metallic elements quickly.

The MAPEGROUT SV family of products includes a high-ductility version, MAPEGROUT SV FIBER, specifically modified with steel fibres, as well as MAPEGROUT SV-HP and MAPEGROUT SV-HP FIBER mortars, with particularly high performance properties after short curing periods and at low temperatures, for the highest possible efficiency, including in winter when temperatures are particularly low.

In fact, the HP versions satisfy very high mechanical performances parameters, including at sub-zero temperatures, making it possible to work at low temperatures or at night so that roads can be re-opened to traffic immediately during the next few hours. MAPEGROUT SV FIBER and MAPEGROUT SV-HP FIBER are also recommended for elements that have to withstand dynamic and cyclical loads, thanks to the high tensile strength of the special fibres that confers to the products a very high level of ductility.

The MAPEGROUT SV product range ensures high performance after short curing periods.

# Strengthening solutions for road surfaces

SUITABLE FOR MAINTENANCE AND UPGRADING WORK ON THE SURFACE LAYERS OF EXISTING ROADS, POLYSTRADA MEMBRANES ARE ALSO HIGHLY EFFECTIVE ON NEW CONSTRUCTIONS

Road networks are generally easy to use and provide highly flexible access to the territories they cover, making them the most widely used system for transporting goods and people. The progressive increase in loads and traffic volumes, however, has led to the premature deterioration of road surfaces and the control of networks from an economic and management/functional point of view has become more complex, with a notable effect on road safety and drivers' comfort.
Safety concerns and the need to reduce costs, execution time and the frequency of maintenance work on road networks are a major concern for the organisations that manage them. The development and adoption of innovative solutions for the construction and refurbishment of road surfaces, therefore, is a strategy on which both time and research efforts need to be invested.

**Preventing deterioration**

Deterioration of a road surface is caused by mechanical stresses from traffic, as well as movements or subsidence in the various layers under the surface. This leads to phenomenon such as cracking, plastic-viscous deformation and surface defects, which are then amplified by the action of meteorological events. The effect of water, for example, can be particularly severe because it penetrates into cracks, which is aided by the passage of tyres on the road surface (pumping phenomenon).
In this context, it is very important to pinpoint the origin of defects and the mechanisms that trigger them. Targeted interventions during the installation phase or when refurbishing road surfaces, with the aim of mitigating or eliminating some of the phenomena that trigger deterioration, are the correct approach to improve the service life of road surfaces and reduce maintenance costs.
And Polyglass Research & Development has pursued this approach to develop and propose products from the POLYSTRADA range. These products combine the strengthening properties of fibreglass carriers and fabrics with the cushioning/absorbing effect of the stress/deformation state in paving typically found in SAMI (stress absorbing membrane interlayer) systems. Their particular conformation also guarantees that the inside of the road structure remains waterproof while providing a highly effective solution to pumping phenomenon.

**Laboratory tests**

The membranes from the POLYSTRADA line are improved-performance, innovative composites specifically designed for strengthening road paving. They consist of a polymer-modified bituminous compound with high rheological properties reinforced with a glass fibre composite.
The experimental phase to characterise and qualify products from the POLYSTRADA line was carried out in collaboration with the Engineering

## ADVANTAGES OF POLYSTRADA MEMBRANES

**Longer lasting and less maintenance**

POIYSTRADA membranes are not affected by the mechanical and thermal stresses endured during the application of the hot mix asphalt overlay, thereby ensuring a longer service life.

**Less cracking**

The unique properties of POLYSTRADA membranes drastically reduce the onset of fatigue cracks.

**Optimised physical/chemical characteristics**

The glass fibre strengthening ensures high tensile strength allowing a portion of the tensile stresses to be absorbed, while the special elastomeric bituminous mix gives the membrane the capacity to cushion and distribute concentrated strains.

**Flexible application**

POLYSTRADA membranes can be used directly on top of milled surfaces without the need for newly constructed levelling courses.

**Self-adhesive**

POLYSTRADA membranes are self-adhesive and guarantee excellent adhesion to substrates without having to apply the traditional bituminous emulsion tack coat.

**Highly durable**

POLYSTRADA membranes are not affected by the mechanical and thermal stresses endured during the application of the hot mix asphalt overlay, such as the stress of very hot material being laid on top, road construction equipment being driven over the system, compacting of the asphalt mix, etc.

**Compliant with European standards**

POYGLASS membranes comply with EN 15381 standard for strengthening systems for bituminous overlays.

**Barrier to the harmful effects of water**

POLYSTRADA membranes have waterproofing properties that stop water penetrating deep into the unbound underlying layers of the pavement and/or stop water and fine material creeping back to the surface as a result of the vehicle tyres' pumping action.

Faculty at the University of Padua (Northern Italy).
The research was based on a comparison of double-layered bituminous systems, both with and without the application of a membrane at the interface. By adopting this approach, it was immediately possible to compare the properties of a standard stratographic layout with the one proposed by Polyglass including a POLYSTRADA SA PLUS membrane.
The properties of the test samples were evaluated by carrying out a series of tests to determine their shear strength according to prEN 12697-48.
The aim of this analysis was to characterise the bonding strength of the double-layered system and enabled important data to be extracted regarding the behaviour of the material at the interface during the application of a load.
The results showed that the behaviour at the two interfaces - with and without a POLYSTRADA membrane – was very different. The presence of a POLYSTRADA membrane allows for a higher level of adhesion compared to the sample without a membrane. The latter, however, displayed more fragile behaviour at the interface, with detachment between the two surfaces and failure at the interface itself. Special equipment was used to apply cyclical, dynamic flexural loads to analyse the behaviour of the two types of two-layered samples.
This test enabled the stiffness of the system according to EN 12697-26 and its resistance to fatigue according to EN 12697-24 to be evaluated. The stiffness tests confirmed what had already been indicated by the shear strength graphs, that is, the higher level of adhesion at the interface in the sample without a membrane has an influence on the overall stiffness of the system, the consequence of having a better interconnection between the two layers.
This behaviour, however, is not beneficial when we consider the resistance to fatigue of a double-layered system.
In fact, it is here that the membrane carries out its key function as an element with the capacity to dissipate strains, thereby delaying failure of the sample (Fig. 1).
At a μstrain level of 400, it is possible to notice that the stress failure cycles for the double-layered system were twenty times higher on average when a POLYSTRADA membrane was applied at the interface (Fig. 2).
The results obtained attest the performance benefits deriving from the use of POLYSTRADA strengthening systems. The specific characteristics of the membrane used means it functions as an *anti-cracking layer*, making this system tougher and with the capacity to have better resistance to stresses.

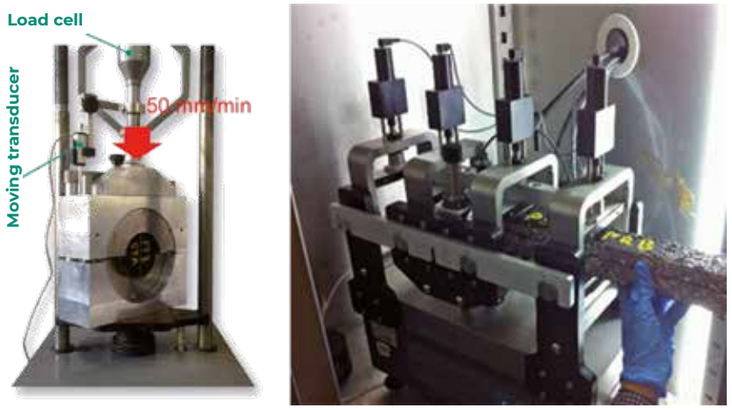



**PHOTO 1.** Analysis of shear and flexural strength for a double-layered system

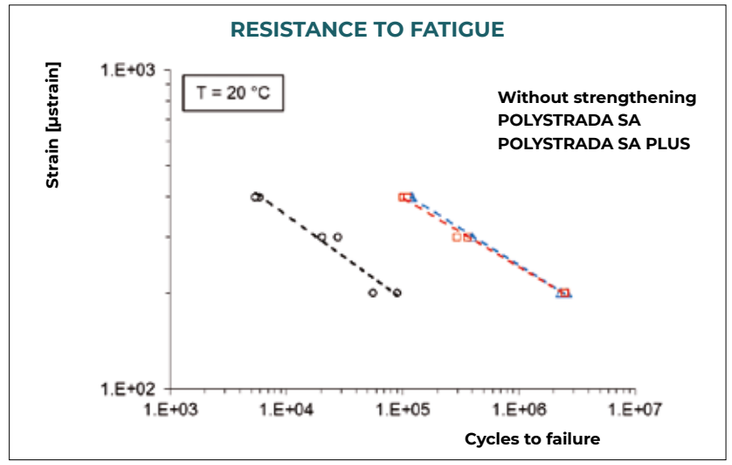



**FIG. 1.** Analysis of the resistance to fatigue of the samples with and without a POLYSTRADA membrane.

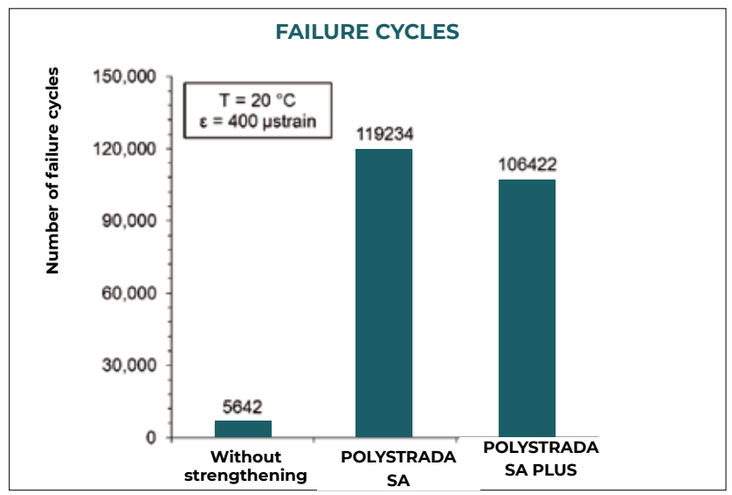



**FIG. 2.** Number of failure cycles at 400 μstrain for test samples without a membrane and with a POLYSTRADA SA or POLYSTRADA SA PLUS membrane.

Preparing the installation layer with a primer for bituminous membranes. Using bituminous membranes on road surfaces allows to increase the durability and resistance of road surfaces, reducing maintenance costs.

**The Polyglass product range**
From an application point of view, Polyglass proposes dedicated solutions for newly-constructed paving, according to their expected volume of traffic.
For low to medium volumes of traffic, for example, the membrane is applied under the wear layer, which needs to be at least 40 mm thick.
For medium to high and high volumes of traffic, the stratographic layout is more complex in order for it to withstand higher levels of stress.
Thanks to their ease of application, POLYSTRADA membranes are extremely versatile and may also be used to refurbish existing paving.
Polyglass also proposes application solutions for this type of requirement (see table below) in order to meet the needs of all clients.

| | | VOLUME OF TRAFFIC | | |
|---|---|---|---|---|
| | | LOW | MODERATE | HIGH |
| **Level of deterioration** | LOW | - | **Polystrada SA V** | **Polystrada SA V** |
| | MODERATE | **Polystrada SA V** | **Polystrada SA** | **Polystrada SA Plus** |
| | HIGH | **Polystrada SA** | **Polystrada SA Plus** | **Polystrada SA Plus** |

Polyglass' solutions for refurbishing existing paving.

## POLYSTRADA SEALANT

When carrying out work on road paving, sealants are used to both finish off and seal particular areas of the paving (such as kerbstones, gaps between membranes, reflective cracks, etc.) and to form elastic joints in gaps between different areas of asphalt to enable them to work together. Using sealants is also particularly effective in the case of alligator cracking caused by mechanical stresses and loads, and of block cracking caused by shrinkage of the bitumen due to cyclical temperature variations.
Polyglass developed POLYSTRADA SEALANT, which is particularly suitable for application on wear layers with surface defects. It is highly effective in the case of alligator cracking. Using POLYSTRADA SEALANT stops these defects from propagating any further and also acts as a layer that provides better grip for a vehicle's tyres, including in bad weather. It allows to extend the service life of paving by 4 to 7 years and limit maintenance costs.
POLYSTRADA SEALANT is a hot-poured, bituminous elastomeric plastomeric sealant formulated with bitumen and elastomeric resin to form a highly strong bond on both asphalt and concrete. It is ideal for sealing horizontal surfaces, filling cracks in paving on concrete and asphalt roads, for underground services, and for cracks in roads with high volumes of traffic. Its special formulation makes it resistant to acid and alkaline solutions and forms a durable, impermeable and flexible solution. Its excellent elasticity helps limit detachment from the sides of cracks and allows joints to follow structural expansion movements in the road surface without being damaged. It has the capacity to penetrate deep down into cracks and reach the lower layers of the paving system, a characteristic which makes it particularly suitable for filling gaps up to 50 mm wide or 50 mm deep. Thanks to its waterproofing action, the product is also able to counteract and limit the pumping phenomenon of water by vehicles.


1


2

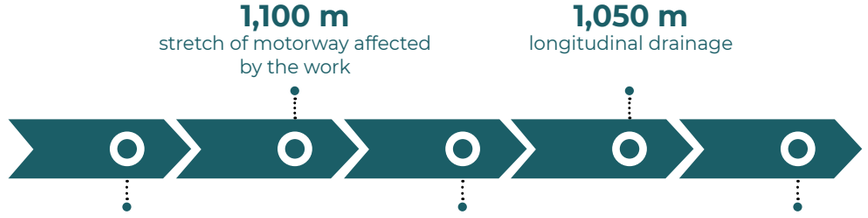

3

**1.** Positioning the POLYGLASS SA PLUS membrane.
**2.** Laying the bituminous conglomerate over the POLYSTRADA SA PLUS membrane.
**3.** Opening of the stretch of motorway upon completion of the work.

**Salerno - Reggio Calabria (Italy)**

# A2 Mediterranean Motorway

THE HYDRAULIC FUNCTIONALITY OF THE PAVING WAS RESTORED BY CARRYING OUT ANTI-CRACKING AND ANTI-PUMPING WORK




The A2 “Autostrada del Mediterraneo" (Mediterranean Highway) runs through Campania, Basilicata and Calabria regions in Southern Italy and – together with the A1 "Autostrada del Sole" (Sunshine Highway) – it forms the backbone of the road network connecting North and South Italy.
Still generally known as the "A3 Salerno-Reggio Calabria Motorway”, it took on its new name following the modernisation work that had commenced in the 1990’s, when it became necessary to carry out a complete overhaul to withstand the changing traffic conditions and meet new requirements for the circulation, and to bring the motorway in line with European standards.
Running for a total of 432.2 km, the motorway connects the cities of Salerno to Reggio Calabria and is characterised by its particularly complex route that had to be adapted to suit the characteristic morphology of this mainly mountainous part of the country: along the route there are 51 junctions, 185 tunnels and 1,070 bridges, viaducts and flyovers.
The A2 will be the first "smart motorway" in Italy, with Wi-Fi hotspots every 300 m to allow motorists access to useful and important road safety information.

**The problem: rising groundwater and pumping phenomenon**

The overhaul of the A2 motorway in the area around the Rufoli tunnel led to significant modifications being made along that particular stretch, which also involved having to deal with considerable quantities of groundwater.
In correspondence with the containment works, a substantial defence system was also installed to intercept the groundwater and channel it into the natural drainage system, which until then had not been fully efficient.
In fact, in the event of particularly bad weather, the groundwater would rise up and flood the road surface and lead to pumping phenomenon, damaging the superstructure.

**Works carried out**

To solve the problem, the first step was to mill the top 10 cm from the road surface (5 cm of binder and 5 cm of wear layer). A drainage trench was then dug out along the side of the motorway, along with a series of smaller, transversal channels to capture and channel the water away.
The next step was to apply a 2.5 mm POLYSTRADA SA PLUS anti-pumping membrane (made by Polyglass SpA, a subsidiary of the Mapei Group) and then restore the layer of binder and the wear layer.
The POLYSTRADA SA PLUS membrane, which has anti-cracking properties to protect the structure and anti-pumping (waterproofing) properties, was positioned in such a way that any milling work required in the future, or repairs to the wear layer, can be carried out without having to remove it.
POLYSTRADA SA PLUS is designed to ease/absorb deformation stresses within the road surface and represents an innovative solution for strengthening bituminous systems and replacing strengthening mesh or other traditional systems (SAMI, geotextiles, etc.). Its excellent dimensional stability and mechanical properties make it particularly suitable for waterproofing (anti-pumping) applications, as a barrier to block the propagation of cracking phenomenon, to strengthen road surfaces and to distribute loads acting on road surfaces. It is particularly recommended for intense traffic of heavy-goods vehicles and when the existing road surface is badly worn or damaged.
Using this type of membrane allows a thinner layer of conglomerate to be applied, including recycled conglomerate, thereby significantly reducing the time required and the cost of carrying out work. It can also be milled and recycled without having to use special equipment.
POLYSTRADA SA PLUS helps improve the structural behaviour of road surfaces and their resistance to fatigue and reflective cracks, thereby guaranteeing considerable savings in future maintenance work on stretches of road where it has been employed.

**POLYSTRADA SA PLUS**

Cold-glued self-adhesive membrane comprising a self-adhesive SBS bituminous compound reinforced with a glass fibre mesh carrier.
It is used for the renovation of pavements such as severely cracked road surfaces subjected to high levels of traffic.

**FIND OUT MORE**

**TECHNICAL DATA**
**A2 “Autostrada del Mediterraneo” motorway,** Salerno-Reggio Calabria (Southern Italy)
**Period of renovation works:** July-October 2020
**Period of the Polyglass intervention:** July-October 2020
**Intervention by Polyglass:** supplying waterproofing membranes for restore the hydraulic functionality of the road
**Client:** Anas SpA – Calabria Regional Department, Autostrada del Mediterraneo
**Design:** Nicola Megale (Anas SpA)
**Works direction:** Carmine Avagliano (Anas SpA)
**Main contractor:** Domenico Sposato
**Technical directors:** Domenico Sposato, Giuseppe Tedesco
**Subcontractor:** Costruzioni e Strade Srl
**Mapei distributor:** Agenzia G.N. Rappresentanze Sas di Gioiello Nicola e Libero Alessandro
**Polyglass coordinators:** Ines Antunes and Simonetta Rossi, Polyglass SpA (Italy)

**POLYGLASS PRODUCTS**
Waterproofing membrane:
Polystrada SA Plus

For further information on products visit polyglass.com

**LEFT.**
The Babina Rijeka viaduct, located in Zenica.

**Zenica (Bosnia-Herzegovina)**

# Babina Rijeka and Pehare viaducts

POLYGLASS WATERPROOFING MEMBRANES WERE SUCCESSFULLY USED AS CONSTRUCTION MATERIALS FOR IMPORTANT INFRASTRUCTURES

Polyglass SpA has been operating on the Bosnian market for more than 15 years. Polyglass modified polymer-based bituminous waterproofing membranes are synonymous with quality and are now considered reference products for the country's installation companies and professionals working in the waterproofing sector. But it's not only waterproofing membranes that have made their mark; specific products aimed at the bridge and viaduct sectors have also been successfully launched on the Bosnian market. In fact, numerous road decks have been protected over the last few years with Polyglass membranes, particularly POLYBOND HP.

**Strategic infrastructures for the country's growth**

The 5C Pan-European Corridor is a strategic project for the entire Eastern Europe and, once completed, it will link Budapest to the Croatian port of Ploče on the Adriatic coast, passing through the whole of Bosnia-Herzegovina and the Bosnian capital, Sarajevo, along the way. The new highway (Autoput A1 – E73) is of primary importance for a country characterised by mountain ranges, narrow valleys, numerous rivers and small villages dotted all around the country, and still not very well connected to one another. Modern communications infrastructures, therefore, are an important driver behind the economic and social growth of this country. The bypass around Zenica, approximately 60 km from Sarajevo, was one of the most challenging stretches from an engineering and construction point of view; along just 8 km of road, two tunnels, four viaducts and a bridge had to be built.

The Babina Reijka viaduct, which was constructed on the Donja Gračanica-Drivuša section/Klopče-Donja Gračanica sub-section of the motorway, crosses the Babina valley and is the highest deck ever built until now along the 5C Corridor: 120 m above the River Babina.

The viaduct is made up of two parallel buildings: the left one is 389.2 m long and the right one is 380.74 m long. Each building has three spans supported by one pillar at each end and two central pillars. The height of the two central pillars range between 60 m and 80 m, with a central span of around 165 m. The pillars are anchored in round, reinforced concrete, 18 m-deep wells measuring 12 m in diameter at the base, while their top ends are elastically constrained to the superstructure. The superstructure is made up of a 6.5 m wide reinforced concrete caisson prestressed in a longitudinal direction, with a box-like section that can be varied in height. The width of the upper part of the deck is 13.76 m.

The Pehare viaduct was also built along the same stretch of motorway

**LEFT.**
Waterproofing the road surfaces with Polyglass solutions.

and is also made up of two separate structures: the building on the left is 429.95 m long and the one on the right is 420 m long. The size and position of the pillars was dictated by the geological characteristics of the soil and the local road network. In fact, a part of the geological landscape coincides with a particularly unstable area subject to landslides, while the other part does not suffer from any stability problems. The width of the upper part of the deck is 11.70 m, not including the concrete safety barrier.

**A membrane designed for bridges and viaducts**

Polyglass SpA took part in the construction of this important infrastructure by supplying the 5 mm plastomeric bituminous membrane POLYBOND HP, a product specifically designed for bridges and viaducts and compliant with EN 14695 standard *(Reinforced bitumen sheets for waterproofing of concrete bridge decks and other trafficked areas of concrete)*.

The concrete deck was initially treated with MAPEFLOOR I 914, two-component epoxy protective coating for concrete, that was broadcast with quartz sand. The product is manufactured and was supplied by Mapei. The next step was to apply the membrane using the traditional torching technique. The special bituminous compound formulation combined with the optimum mechanical parameters offered by the internal reinforcement, consisting of spun-bonded stabilized polyester, make the product suitable to receive paving of hot asphalt with the use of pavers and rollers.

POLYBOND HP and MAPEFLOOR I 914, were approved by the Federal Ministry of Spatial Planning (document number: UPI/03-19-2-75/20) before the installation.

During the application several pull-out tests were carried out on site with very good results about the adhesion of the product onto the concrete load-bearing structure.

**POLYBOND HP P**

Prefabricated elastomeric-plastomeric waterproofing membrane with excellent performances.

**FIND OUT MORE**

**TECHNICAL DATA**
**Babina Rijeka and Pehare viaducts,** Zenica (Bosnia Herzegovina)
**Period of construction:** 2016-2020
**Period of the Polyglass intervention:** July-September 2020
**Intervention by Polyglass:** supplying waterproofing membranes
**Client:** JP Autoceste FBiH
**Main contractors:** JV Euro-asfalt and Strabag AG
**Supervision:** JV Egis International & Ipsa Institut d.o.o.
**Polyglass distributor:** KIMEEL d.o.o.
**Waterproofing contractor:** Bersia d.o.o.
**Polyglass coordinators:** Andrea Storani and Unka Duman, Polyglass SpA (Italy)

**MAPEI PRODUCTS**
Treating the concrete deck:
Mapefloor I-914

**POLYGLASS PRODUCTS**
Waterproofing membrane
Polybond HP P

For further information on products visit mapei.com and polyglass.com

# Mapei continues to grow in Ukraine

## THE SUBSIDIARY IN KYIV IS CELEBRATING ITS 15TH ANNIVERSARY AND CONTINUING TO EXPAND EVEN BEYOND THE NATION'S BORDERS

Mapei Ukraine, the Group's Ukrainian subsidiary, was first established in 2006, approximately 6 years after it first began distributing Mapei products on the local market.

Since then, the company, whose headquarters are based in Kyiv, has continued to grow, setting up an extremely efficient distribution system based around two main sales channels: distributors and DIY.

Mapei Ukraine also uses these channels to supply the market with materials manufactured by other brands belonging to the Group, such as Cercol, Polyglass and others. For example, Mapei and Cercol products can be bought in stores belonging to the big Epicentr chain that has 74 sales outlets (covering an overall area of 1.5 million m²) and attracts 63 million visitors-a-year. These stores sell Mapei and Cercol products for installing ceramic tiles and stone materials..

Mapei Ukraine's network includes 12 distributors in Ukraine and 1 distributor, 1 sales representative and a partner company in Georgia which can efficiently supply the market in both countries with materials from all the Group's product lines.

Mapei Ukraine began expanding beyond the nation's borders in 2009, as it began operating in Georgia, where the subsidiary has set up a profitable business partnership with various construction companies and a distributor.

Thanks to this sales network, the efficiency of its Technical Assistance-Service and the hard work of its 69 members of staff, Mapei Ukraine has grown constantly from when it was first established right through to the present day, totalling revenue of 9.5 million Euros in 2020.

This has been achieved partly through the launching of a new range of admixtures for bituminous road surfaces (see pages 4-27), which account for approximately 1.5 million Euros of the subsidiary's total sales. The result has also been achieved thanks to a working partnership with the company IPT, which does plenty of business in this sector of the market.

The subsidiary seems to have "held up" well despite the challenges posed by the Covid-19 pandemic, and the nation has emerged from the ensuing economic crisis much better than it did from two other recent major recessions that hit the country: the 2009 crisis when its GDP dropped by 14.7% and the 2015 recession (-9.7%). In 2019 the national economy grew by 3.8%. The World Bank is forecasting a 4.5% fall in the GDP in 2020 and according to the International Monetary Fund Ukraine's GDP will grow again in 2021 (+3%).

### All-encompassing marketing

Last year Mapei Ukraine began a partnership with the biggest community of professionals in the Ukrainian building industry: Liha Maistriv, which boasts over 10,000 users sharing their experiences and know-how on the web and at off-line meetings. Working with Liha Maistriv, next May Mapei Ukraine will be holding workshops at KyivBuild 2021, an exhibition focused on the world of building. One of them will be devoted to the ULTRATOP range of systems for cementitious floor and wall coatings, attracting a wide audience to products that are really growing in popularity in the world of interior design.

The "Best mixes for the building industry" prize that the subsidiary was awarded in 2020 pays testimony to Mapei Ukraine's success on the local market: this award is aimed at picking the nation's most outstanding products based on an online vote, crisscrossed with statistics from social media.

Mapei Ukraine has been very active in sports for some time, particularly through its sponsorship since 2015 of Khimik women's volleyball team that has been so successful, winning the National League 9 times, the Ukrainian Volleyball Super Cup 4 times, and the Ukrainian Cup 7 times.

Mapei Ukraine is also planning to take part in the Kyiv Chestnut Run for the second time next May. The race is aimed at raising funds to buy medical equipment for Ukrainian paediatric cardiology and cardiosurgical units.


**1.** Mapei Ukraine's business offices have been operational in Kyiv since 2006.
**2.** Training is an important part of Mapei Ukraine's operations, involving communities of local professionals.
**3.** Since 2015 Mapei Ukraine has been sponsoring Khimik women's volleyball team that won the National League 9 times, the Ukrainian Volleyball Super Cup 4 times, and the Ukrainian Cup 7 times.

**MAPEI UKRAINE**

**2006**
**YEAR OF FOUNDATION**

**9.5**
**MILLION EUROS**
TURNOVER IN 2020

**69**
**STAFF**

**1**
**HEADQUARTERS**
IN KYIV

**1**
**COMMERCIAL OFFICE**
IN DNIPRO


**Kyiv (Ukraine)**

# River Mall Shopping Centre

IN THE LARGEST SHOPPING CENTER IN THE CAPITAL, MAPEI SUPPLIED PRODUCTS SUITABLE FOR AREAS WITH HIGH PEDESTRIAN TRAFFIC

**LEFT.** River Mall is a large shopping and entertainment hub situated on the bank of the River Dnipro in Kyiv which was constructed between 2018 and 2019.
**ABOVE.** Thick porcelain tiles and stone slabs were installed in various internal areas of the complex using Mapei products, such as ADESILEX P9 FIBER PLUS, KERACOLOR FF+FUGOLASTIC and MAPESIL AC



River Mall is one of the largest shopping and entertainment hubs in Kyiv and is located on the left-hand bank of the Dnipro, the river that flows through the Ukrainian capital. It extends over an area of 140,000 m$^2$ and includes more than 160 shops and boutiques, 55 of which belong to famous brands such as H&M, Zara, Zara Home, Oysho, Pull & Bear, Bershka and Stradivarius, as well as other famous fashion retailers such as Hugo Boss, Guess, Anabel Arto, and Tezenis. There are also 16 sportswear outlets featuring leading brands such as All Star, Adidas, Nike, Puma and Under Armour. The complex also has a large supermarket which sells food and homeware, and a dedicated food court with fast-food joints and restaurants. On the entertainments side, there is the Planet Cinema complex, featuring 10 screens and its own restaurant, and a children's play area. The shopping centre has a multi-storey carpark with 5 floors above ground level and 2 below ground level, for a total of 1550 parking spaces. A terrace overlooking the river completes the attractions of River Mall.

**High performance products for "heavily trafficked" surfaces**

Construction of the complex was carried out between 2018 and 2019 and various Mapei products and systems were employed, particularly to install large format porcelain tiles (1200x600x9 mm) and stone slabs in various areas around the site, including those which would be most subject to high volumes of pedestrian traffic.
The first step was to prepare the concrete substrates by treating their surface with PRIMER G synthetic resin-based primer in water dispersion with very low emission of volatile organic compounds (VOC).
Ceramic tiles and stone slabs were bonded in the corridors, the food court and on the terrace with ADESILEX P9 FIBER PLUS, a fibre-reinforced, cementitious adhesive, which is distributed on the Ukrainian market by Mapei Ukraine.
The product chosen to grout the tile joints was KERACOLOR FF, a high-performance, polymer-modified cementitious mortar with water-repellent DropEffect® technology for joints up to 6 mm wide.
Instead of using water, the mortar was mixed with FUGOLASTIC, a liquid polymer admixture used to improve adhesion and mechanical strength and to reduce porosity and absorption.
This system (KERACOLOR FF+FUGOLASTIC) is classified CG2 according to European standard EN 13888.
The expansion joints in the internal surfaces were sealed with MAPESIL AC, a mould-resistant, pure, acetic silicone sealant available in 34 different colours, as well as a transparent version.
The product chosen to seal the expansion and distribution joints on floors most exposed to intense traffic, such as those on the terrace, was MAPEFLEX PU 45 FT, a paintable, rapid, polyurethane adhesive and sealant, which is suitable for sealing joints subject to movements up to 20% of the average width of the joint.
To ensure MAPEFLEX PU 45 FT only bonded to the sides of the joints and not to the bottom, MAPEFOAM closed-cell expanded polyethylene cord was placed at the bottom of the joints.

**TECHNICAL DATA**
**River Mall,** Kyiv (Ukraine)
**Period of construction:** 2018-2019
**Period of the Mapei intervention:** 2018-2019
**Intervention by Mapei:** supplying products for preparing substrates, bonding porcelain tiles and stone slabs on floors and sealing joints
**Client:** IA Vilna Ukraina
**Design:** Archpassage Ukraina, Chapman Taylor
**Main contractor:** Altis Holding
**Installation companies:** TBK Altis, Boren A
**Mapei distributor:** Mega-Line
**Mapei coordinator:** Egor Yaschenko, Mapei Ukraine
**Photos:** River Mall

**MAPEI PRODUCTS**
Preparing substrates: Primer G
Installing ceramic tiles and stone slabs: Adesilex P9 Fiber Plus*
Grouting tile joints: Keracolor FF+Fugolastic
Sealing expansion and distribution joints: Mapesil AC, Mapeflex PU45 FT

*This product is distributed on the Ukrainian market by Mapei Ukraine LLC.

For further information: mapei.com and mapei.ua


The Sitina Tunnel, an engineering project that “changed life” in Mapei SK sro, the Group's Slovakian subsidiary.

# Slovakia, leadership built around innovation

FROM A MOTORWAY TUNNEL TO SPORTS FACILITIES: DURING ITS 20 YEARS IN BUSINESS, MAPEI SK SRO HAS BEEN INVOLVED IN PLENTY OF BUILDING PROJECTS ALL OVER THE COUNTRY

The pandemic, which caused the GDP to drop by 5.2% in 2020, has slowed down the Slovakian economy after growing at a faster rate than the European Union average for a number of years. According to the European Commission, the revival in the national economy is speeding up with a 4.7% increase in GDP forecast for this year and 4.4% in 2022.

The building industry had also grown quite considerably prior to the pandemic, thanks mainly to investment in motorway infrastructure and the housing sector. Mapei SK sro, the Group’s Slovakian subsidiary, which is celebrating twenty years in business this year, has also benefited from these favourable economic conditions. Over this period, it has managed to consolidate a favourable position on the local market for chemical products for the building industry.

*“We believe the way to attain leadership in the building industry is through innovation. Our aim is to be an innovative company offering high-quality products and technology tailored to the market’s needs while, at the same time, protecting the environment and the health of both clients and installers”*, so Miroslav Jaška, General Manager of Mapei SK sro, noted.

**A glance back into the past**

The Slovakian subsidiary was first established in 2001, when it operated as an outside branch of Mapei’s business office in the Czech Republic, employing just five members of staff. Since then, Mapei SK sro has continued to expand by reorganising its operations and fine-tuning its business strategy, partly by supplying products for constructing important engineering works. Predominant amongst these works was Sitina tunnel, a crucial stepping-stone in the company’s growth. *“Up until then we had been operating in a rather makeshift manner, often drawing on the help of our colleagues in the Czech Republic. That particular building project brought with it numerous changes in our internal organisation: we began employing bespoke work units and developed a corporate structure similar to the kind we have today”* so Miroslav Jaška went on to say.

Following a period of constant growth, Mapei SK sro had to deal with the 2009 economic recession that had a notable impact on the Slovakian building industry. Nevertheless, the subsidiary managed to get through that tricky period and become a leading player in supplying chemical products for the nation’s building industry. During its twenty years in business, Mapei SK sro has successfully left its mark on numerous building projects carried out throughout the country. These include tunnels, water parks, swimming pools, spas, shopping malls and sport facilities. “We are particularly proud to have contributed to the construction of the National Football Stadium (see the article that follows, Editor’s Notes)”, so Miroslav Jaška went on to note.

Mapei SK sro’s goals for the coming years have not changed: it aims to become one of the three leading Slovakian suppliers of chemical products for the building industry.

**Projects for renovation and young people**

Mapei SK Sro is closely engaged in various marketing operations that focus on local requirements. For example, it is involved in a project sponsored by the Slovakian University of Technology in Bratislava and the Slovakian division of the Green Building Council. This project hinges around renovating the nation’s housing-property heritage and making it more energy-efficient. The project has showcased how innovative products and the right technology can modernise old housing structures, transforming them into healthy and comfortable homes that are energy efficient and designed to last. Thanks to various campaigns on different types of media, Mapei SK sro has successfully showcased itself as the right partner for anybody interested in renovating their own home.

The Slovakian subsidiary has also helped launch the “Mapei for young people” project aimed at getting students from selected technical institutes to enter a competition to install and grout ceramic tiles and mosaics. After holding a theoretical session about Mapei products at the schools involved in the project, it organised events that gave young people the chance to put their know-how and manual expertise into practice, thereby enhancing their professional skill set.

**LEFT.**
The “RenovActive” project presents Mapei SK sro as a reliable partner for supplying products for upgrading housing in Slovakia.


Mapei SK sro’s headquarters in Ivanka pri Dunaji, in the Bratislava region, is equipped with spacious offices and warehouses for storing products.

## MAPEI SK SRO

**2001**
**YEAR OF FOUNDATION**

**8**
**MILLION EUROS**
TURNOVER IN 2020

**50**
**EMPLOYEES**

**1**
**HEADQUARTERS**
IN IVANKA PRI DUNAJI

**Bratislava (Slovakia)**

# National Football Stadium

MAPEI ADMIXTURES FOR CONCRETE AND SYSTEMS FOR VINYL INSTALLATION IN A CUTTING-EDGE SPORT VENUE

**TOP OF THE PAGE.** Vinyl floor coverings were installed in the changing rooms with ULTRABOND ECO VS90 PLUS, after treating the substrates with PRIMER G and ULTRAPLAN RENOVATION.

The newly built football stadium at Tehelné pole (also called "National football stadium") meets the requirements of UEFA and is equipped with modern technologies: it not only enhances the sports experience, but also ensures the safety of its visitors. The stadium is designed for hosting the Slovak national football league matches (it is home to the players of the Slovan Bratislava club), national football events as well as concerts and cultural events, with a capacity of 22,500 spectators. The complex also includes a hotel, office space and apartments and meets the standards of modern buildings, with special attention paid to eco-sustainability and energy efficiency.

**The challenges for the concrete**

The main structure of the stadium and its adjacent buildings is made of a combination of cast concrete and precast concrete elements. "*The stadium at Tehelné pole is exceptional in its importance at the sporting level, but also as for the investor's construction requirements. The fact that the building had to be completed in the city influenced its construction, including concrete casting,*" claims the management of Frischbeton (a division of Strabag) which supplied the concrete for the new stadium. Thanks to the use of the most suitable concrete mix, the service life of the new stadium at Tehelné pole is expected to be at least 100 years.

Concrete was used not only in the foundations, but also in the main structure of the stadium and in the adjacent buildings. The construction work was complex due to the urban environment, the pressure to meet deadlines, and adverse weather conditions. However, the concrete manufacturer benefited from a close partnership with Mapei experts, who worked with Frischbeton to create the most suitable concrete formulation. The use of Mapei admixtures for concrete, such as superplasticizers (DYNAMON PCT 629), air-entraining agents (MAPEAIR LP100), accelerators (MAPEFAST CF1) and retardants (MAPETARD VZ) distributed in the Slovak market by Mapei SK sro, ensured an excellent workability of the concrete which, in turn, enabled to meet the contractor's quality requirements and time schedule. The contractor and the concrete manufacturer especially appreciated Mapei's technical support, which ensured regular quality checks of the concrete, site inspections and fast problem solutions.

**Vinyl floors for the changing rooms**

Vinyl floorings were chosen for the changing rooms as they can ensure excellent aesthetic impact, durability and easy maintenance.

The first step was to treat the substrates with PRIMER G synthetic resin-based, water-dispersion primer, to improve the adhesion of the following layers.

ULTRAPLAN RENOVATION self-levelling compound was applied thereupon, to ensure high resistance to loads and traffic.

The vinyl flooring was then bonded with ULTRABOND ECO VS90 PLUS, hard set, highly shear resistant, wet-bed dispersion adhesive with a very low emission level of volatile organic compounds (VOC).

**ABOVE.** The National Football Stadium in Bratislava is an ultramodern sport facility that was completed with Mapei admixtures for concrete.



**TECHNICAL DATA**
**National Football Stadium,** Bratislava (Slovakia)
**Period of costruction:** 2013-2019
**Period of intervention:** 2017-2019
**Owner:** Národný futbalový štadión, a.s.
**Intervention by Mapei:** supplying admixtures for concrete, products for substrate preparation and installation of vinyl floorings
**Concrete producer:** Frischbeton s.r.o.
**Design:** Karol Kállay
**Main contractor:** Strabag
**Installation of vinyl floors:** Ekopol, spol. s r.o.
**Mapei coordinator:** Ján Fleischhacker, Mapei SK s.r.o (Slovakia)

**Photos:** Martin Matula

**MAPEI PRODUCTS**
Preparing substrates:
Ultraplan Renovation, Primer G
Installing vinyl floors:
Ultrabond Eco VS90 Plus
Admixtures for concrete:
Dynamon PCT 629*, Mapeair LP100*, Mapefast CF1*, Mapetard VZ*

*These products are distributed on the Slovak market by Mapei SK sr.o

For further information on products:
mapei.com
mapei.sk


Everyone likes living in healthy, damp-free surroundings, but you need to find the correct, sustainable products to keep your walls healthy over the years. **Poromap Deumidificante** one-component render and **Mapestop Cream** chemical barrier are the best choices to restore the walls of your home.



# Dehumidifying systems for damaged masonry

MAPEI
FOR YOUR
HOME

## MAPEI SOLUTIONS FOR RESTORING EVERY TYPE OF HOME: FROM THOSE RECENTLY CONSTRUCTED TO THOSE OF HISTORIC INTEREST

Many private homes, both those only recently built and those of historic or architectural interest, often need work carried out on them to dehumidify the masonry by applying dehumidifying render and/or a chemical barrier. The purpose of this type of intervention is to repair damage due to deterioration caused by rising damp and/or saline aggression that masonry often suffers from. What should you do in such situations? Apart from their technical support service, Mapei has a number of different solutions available.

**1** Complete system for restoring masonry damaged by capillary rising damp.
POROMAP DEUMIDIFICANTE + SILANCOLOR RANGE.

**2** Complete system for restoring masonry damaged by rising damp using cement-free mortars.
MAPE-ANTIQUE RANGE + SILEXCOLOR RANGE

**3** Chemical barrier to counteract rising damp and restore damaged masonry.
MAPESTOP CREAM

**4** Complete system made from natural hydraulic lime used for restoring masonry with problems caused by rising damp
MAPE-ANTIQUE ECO RISANA + SILEXCOLOR RANGE

**5** Complete system for waterproofing and renovating structures below ground level with negative water pressure and anti-condensation cycle
MAPEWALL RENDER & STRENGTHEN + MAPENET EM40 + MAPEFIX VE SF + PRIMER 3296 + MAPELASTIC FOUNDATION+ MAPEPROOF RANGE + POROMAP RINZAFFO PLUS + POROMAP DEUMIDIFICANTE + POROMAP FINITURA CIVILE + SILANCOLOR PRIME R+SILANCOLOR PAINT

# Mapestop Cream: the “do-it-yourself” chemical barrier

Chemical barriers are “horizontal blocking” systems put in place to counteract rising damp.
This technique may be used on any type of masonry and consists of making a section of the masonry hydrophobic through the injection of silicone or a siloxane-based micro-emulsion into the masonry in order to “repel” the capillary lift of moisture and keep saline solutions below the barrier.
MAPESTOP CREAM, a monomeric silane-based creamy emulsion, is the chemical barrier that Mapei tends to turn to in most of those situations where a system is required to drastically reduce capillary rising damp in all types of existing stone, brick, tuff, concrete and mixed masonry, including masonry of buildings of historic or architectural interest.
This is a simple, quick solution that can be used in combination with dehumidifying render to extend its durability.
This technique may also be implemented for the following type of intervention:

- Restoring exposed-finish masonry;
- External thermal insulation systems and insulating render;s
- For layers of “reinforced” render.


**Watch the video on how to apply MAPESTOP CREAM:**


**Find out more about this product:**

# Dehumidifying render for every kind of problem

Mapei has developed two distinct types of systems for restoring masonry damaged by rising damp and saline aggression:

- Two “traditional” cement-free, lime-based dehumidifying systems.
  The former has been designed for highly aggressive environments and is made up of hydrated lime and Pozzolanic materials It encloses a product to form a base layer (MAPE-ANTIQUE RINZAFFO) and a second product to form the actual dehumidifying render (MAPE-ANTIQUE MC or MAPE-ANTIQUE MC MACCHINA).
  The latter system is made up of pure NHL (Natural Hydrated Lime) and has been designed to solve all the most common problems affecting the bases in every kind of masonries. It includes a product to form a single layer (MAPE-ANTIQUE ECO RINZAFFO) and a macro-porous, dehumidifying render (MAPE-ANTIQUE ECO RISANA).

**Punta Sottile Lighthouse, Favignana (Italy).**
Various works were carried out to completely refurbish the Punta Sottile Lighthouse in Favignana (Siciliy, Italy), including the restoration and renovation of the masonry using specific products, such as MAPE-ANTIQUE ALLETTAMENTO, MAPE-ANTIQUE RINZAFFO,

The chemical, physical, elastic and mechanical properties of the above-mentioned dehumidifying systems belonging to the MAPE-ANTIQUE line are very similar to the ones of rendering mortars originally used in the construction of buildings and are, consequently, compatible with every kind of original building. At the same time, they feature high resistance to both atmospheric agents, such as acid rain and polluting gases, and the action of soluble salts and capillary rising damp.

- A single-product/single layer dehumidifying system for solving all the problems caused by capillary rising damp, which does not need the use of a product to form a base layer. It is made up of a highly breathable, salt-resistant, lightweight macro-porous render: POROMAP DEUMIDIFICANTE.

**MAPE-ANTIQUE ECO RISANA**


**Find out more about this product:**

# The quick, simple dehumidifying solution

POROMAP DEUMIDIFICANTE is a ready-mixed powdered mortar for macro-porous and insulating dehumidifying render made from special, Pozzolan-reaction and salt-resistant hydraulic binders, natural sand, lightweight aggregates and special additives with very low emission level of volatile organic compounds (EMICODE EC1$^{Plus}$). Characterised by excellent workability and thixotropy, it may be applied directly without a base layer in thicknesses of at least 2 mm without a scratch coat in thicknesses of at least 2 mm without having to carry out any intermediate operations.
Ideal for every type of masonry, this product has been developed to be fully compatible with masonry suffering from rising damp. It is also lightweight, contains added fibres and can be prepared with an electric drill at low-speed with a mixing attachment.

**POROMAP DEUMIDIFICANTE**


**Find out more about this product:**

**Milan water treatment plant**
A historic building was given a new lease of life by turning it into a museum, thanks also to special products for restoring and renovating masonry.
The products used for this project included MAPE-ANTIQUE STRUTTURALE, MAPE-ANTIQUE ECOLASTIC, MAPE-ANTIQUE ECO RINZAFFO, MAPE-ANTIQUE ECO RISANA and MAPE-ANTIQUE ECO RASANTE.

## HOW TO FINISH OFF DEHUMIDIFYING RENDER: A SKIM COAT AND A COLOURED FINISH

Whichever system you decide to use, work must always be completed by applying a suitable finish and paint that do not hinder in any way the evaporation of the humidity present in the masonry. On this regard, Mapei product range includes three different lines of highly breathable skimming products in various aggregate sizes:

- MAPE-ANTIQUE FC cement-free hydrated lime based skimming mortar;
- MAPE-ANTIQUE ECO RASANTE cement-free skimming mortar made from pure NHL (natural hydraulic lime);
- POROMAP FINITURA CIVILE lime-based, transpirant skimming mortar.

All Mapei dehumidifying skimming products match perfectly with coloured coatings from the SILEXCOLOR, SILANCOLOR and SILANCOLOR PLUS ranges, which are fully compatible with lime-based render and have excellent breathability.

# Natural radioactivity: Radon

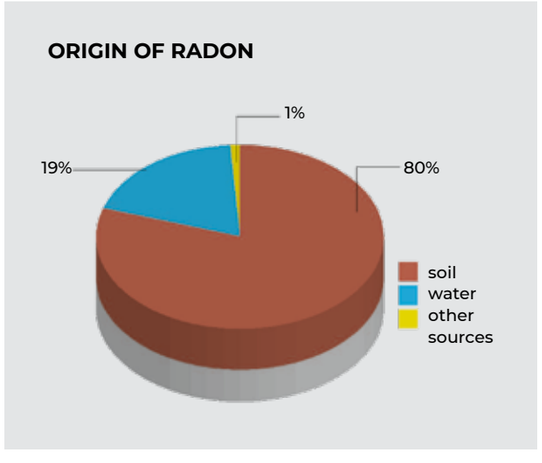

ORIGIN, RISKS AND PREVENTION: A TALK WITH GIANCARLO CIOTOLI, RESEARCH SCIENTIST AT THE ITALIAN NATIONAL RESEARCH COMMISSION, INSTITUTE OF ENVIRONMENTAL GEOLOGY AND GEO-ENGINEERING

Wherever we find ourselves, we are constantly "immersed" in ionizing radiation from space (cosmic rays), but it also hits us when we are outdoors, due to the decay of radioactive elements present in the rock from which the Earth is made, and inside our homes from building materials. Natural radioactivity is a lot more harmful than artificial radioactivity. In fact, natural radioactive sources are the main cause of our exposure to ionising radiation, which is known to be cancerogeneous. Radon (Rn) is one of the main sources of ionising radiation. Radon is a naturally-occurring radioactive gas that is part of the family of noble gases. It is odourless, colourless and tasteless, making it imperceptible to our natural senses, which is why it is so difficult to detect and quantify its presence unless special, highly sensitive instruments are used. And because it is naturally occurring and is an important component of the total level of ionising radiation, its potential danger is often underrated. In 2021, the World Health Organization estimated that radon is the main case of pulmonary neoplasms (between 3 and 14%) after cigarette smoke in every country, and that its level of risk depends mainly on the average national radon concentration level in homes and its synergic action with tobacco smoke.

**BELOW.** Ingress and spread of radon gas inside a building. Radon can spread from the ground into closed environments through faults and cracks in foundations and floors in basements, through cable and pipe runs and through floors-walls joints.


**Where does it originate?**
Radon originates from the "nuclear decay" of its direct parent material, Radium (226Ra), which in turn is one of the main products in the chain of radioactive decay of Uranium (238U), an element widely diffused in small quantities throughout the whole of the Earth's crust. The most common natural Radon isotope is Radon-222 (222Rn) which decays in just a few days, that is, its concentration halves in 3.82 days, giving off alfa-type ionising radiation (particles with two protons and two neutrons) and forming so-called decay products (the offspring, or progeny, of radon) which are also radioactive, such as Polonium, Lead and Bismuth.

**Where is it found and how does it spread?**
Uranium and Radium are solid elements that have been present in highly variable quantities in rocks since the formation of the Earth, which means they can also be found in construction materials derived from these rocks (cement, tuff, bricks, Pozzolan, granite, etc.). Radon can also be found everywhere on Earth, albeit in highly variable concentrations, but since it is the only gas in the decay chain, it is able to be released from grains of soil, move through pores in soil by diffusion and/or migrate along fracture zones (faults) for tens and hundreds of metres by advection (movement generated by pressure gradients) and, before giving origin to its decay products, it is released from the ground, from construction materials and from groundwater and, as a result, enters into buildings.
Once Radon is released from rocks and passes through the ground, it reaches the surface and quickly mixes with the atmosphere, where it can be found in concentrations of between 5 and 15 Bq/m³. The variation in concentrations of airborne Radon depends on an area's physical parameters, such as morphology, or on meteorological parameters, such as atmospheric pressure, temperature, humidity and wind speed. Once it enters into buildings, the variability in radon concentration increases due to parameters determined by the construction characteristics of the building and by the lifestyle of its occupants.




**Where is it present?**
As mentioned above, the presence of radon at the surface is determined by the geological, structural and morphological characteristics of the territory which, in turn, depend on global dynamics and, therefore, vary from place to place.
Our planet has a large variety of different geological scenarios, which means radon concentrations, produced by rocks below ground that are then able to reach the surface, are not uniform and vary quite considerably, even within the confines of an apparently homogeneous territory. The largest contribution depends mainly on the lithological characteristics of the territory and the presence of certain rock types in particular that have a higher content of Uranium and Radon, such as effusive volcanic rocks (tuff, basalt, etc.). These rocks can release larger amounts of radon, with respect to the amount produced at a balanced state of Uranium and Radon concentrations, according to their permeability and fracture state. In fact, the presence of fractures and faults allows Radon present below the surface to migrate more quickly towards the Earth's surface, giving rise to high concentrations of this gas in the ground. Radon can then spread from the ground into closed environments through faults and cracks in foundations and floors in basements, through cable and pipe runs, joints between floors and walls, etc., according to the structural characteristics of buildings. Rooms below ground level, therefore, are particularly at risk, especially if their walls have not been rendered.
Rocky materials used for construction purposes can also contain high concentrations of radionuclides (Uranium and Radon) and have a harmful level of radon emissions. Emission levels are that much greater the higher the concentration level of radon and the porosity of the materials. Particularly high Radon levels may be associated with certain types of Pozzolan cement, clay materials and/or tuff. In general, however, the contribution to emissions from well-sealed and/or well aired building materials is negligible.

**How do you measure Radon levels and where should they be monitored?**
Even though it is possible to have an idea of the amount and estimate the presence of radon in the ground for quite large areas, it is more complicated to predict the precise concentration levels of this gas in a certain home, due to the extreme variability caused by factors such as climate and lifestyle. What is more, as already discussed, it is impossible to rely on our senses to detect the presence of radon. As a result, to measure the amount of radon present in a certain building, we have to measure the level of airborne radon using special measuring equipment. Indoor radon levels are expressed in Bq/m³ (Bequerels per cubic metre). For example, a concentration of 100 Bq/m³ means 100 radon atoms disintegrate every second in 1 m³ of the material or air being measured.
To obtain a meaningful measure of the average level of radon we are exposed to within the confines of a habitation, we also have to take into consideration how radon concentration varies, not only between different zones of a certain territory and from home to home, but also over time due to numerous meteorological and lifestyle factors that have an effect on this phenomenon. The presence of radon in a closed environment varies constantly, both in the arc of a single day (levels are generally higher at night than during the day) and from season to season (concentration levels are normally higher in winter than in summer), which means it is important to monitor levels for a lengthy period of time, generally a whole year. In this case, measurements can be taken in one or more consecutive campaigns, depending on the type of instrument used.
In general, the level of radon varies between one floor and another of a building: at the lower floors and those below ground level, where there is closer contact with the ground, there will probably be higher concentrations of

radon. For habitations on one level it is sufficient to measure a single room, while for habitations on more than one level, it is possible to take a single measurement at the lowest inhabited level, or at each level if you also wish to measure the effect of construction materials. In general, the rooms that need to be taken into consideration when measuring the level of radon in a building are those most used, while bathrooms, kitchens, utility rooms, garages and basements are generally excluded.

**What instruments are used to measure the concentration of Radon in a room?**
Two types of instrument may be used to measure the level of radon in a room: passive instruments and active instruments. Passive instruments (dosimeters) are small devices and do not need a mains supply. They supply an average value of airborne radon concentration over the period of time of exposure. Passive dosimeters consist of a plastic casing containing an element sensitive to radon (trace or electric-field detector). This type of instrument does not give off any substance or radiation. The dosimeter is placed in a room for a specified period of time. At the end of this period, it is sent to a laboratory which analyses the trace and then sends back the results. In particular cases, in agreement with trained personnel, active dosimeters may also be used to read levels over a shorter period of time and for monitoring on a continuous basis, such as to plan and/or evaluate the effectiveness of clean-up operations in buildings with high levels of radon. The principle of this type of instrument is based on the taking of a sample of the indoor air and measuring the level of radiation given off by the radon contained in the air.

**What is the risk of Radon?**
Because it is so widespread, radon presents the highest risk amongst ionising radiation sources to people. Since Radon is a non-reactive noble gas, once it is inhaled it is not deposited in the lungs, but quickly expulsed with negligible effect on radioactivity in the lungs. The harmful side-effects of Radon are mainly due to the by-products of decay: solid, α-emitting radioactive elements (Po-218 e Po-214). These elements, which at the same time are present in the air, can become attached to airborne dust or to particles of smoke and then be inhaled or swallowed and deposited in bronchial or pulmonary tissue, where they give off significant doses of α radiation.
While human skin is not particularly sensitive to α radiation, the same cannot be said for the cells of the tissues of our internal organs, especially bronchial and pulmonary tissues, which are highly sensitive to these particles and the level of damage that occurs depends on the intensity and duration of exposure. The different radioactive substances produced by the decay of Radon, therefore, can enter our body, reach the internal organs and remain there for a long time, constantly giving off their radiation and, as a result, damaging our health.

The level of airborne concentration of products from the decay of Radon reaches its maximum level after a sufficiently long period of time if there is a total lack of ventilation, as soon as radioactive equilibrium is reached between the products of decay and their "parent" Radon. The probability of damage occurring as a result of exposure to a specified concentration of airborne Radon is proportional to the product of Radon activity concentration, in Bq/m³, multiplied by the period of exposure.
In 1988 the World Health Organisation (WHO), through the International Agency for Research on Cancer (IARC), declared that radon is one of the 75 substances cancerogeneous to people, along with benzene and asbestos. In 2008, a study carried out by the Italian Health Institute estimated that, in Italy, 3,200 people die every year of lung cancer caused by Radon, around 10% of the annual number of deaths due to lung cancer.

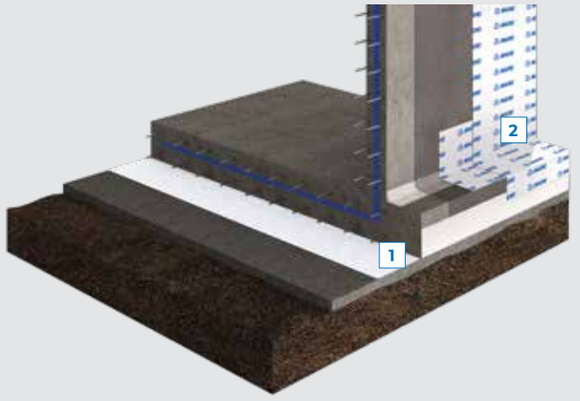
**So what solutions can be adopted to mitigate, expel or block the passage of radon into our homes?**
The main measures at the design stage are to insulate the ground, make sure air gaps and basements are well ventilated, to seal any gaps where gas could enter a building, make floor slabs impermeable and insulate cracks, pipes, etc. Choosing the right construction materials with low natural radionuclide content also reduces concentration levels.
To reduce radon concentration levels in existing buildings, on the other hand, unless large-scale renovation work is scheduled, technical measures can be taken to mitigate the problem, such as simple works aimed at reducing ingress of radon into the building and/or increasing the exchange and circulation of indoor air by introducing air from the outside.
Before deciding on which approach and system to adopt, it is necessary to gather as much information as possible about the building, such as the construction materials used, the characteristics of the ground and subsoil the building was built on and the type of foundations, existing air-conditioning and heating systems, whether it is possible to install extra ventilation and the presence of suitable ground drainage under the building.
In general, the measures to be adopted are:

- more ventilation in the rooms: this solution is very simple, but it does not allow the level of concentration to be reduced if it is particularly high;
- seal any routes where radon can enter: this should always be done because it helps reduce infiltrations of gas from the outside;
- with buildings that have crawl spaces, the most simple solution is to increase natural ventilation and, if that is still not sufficient, to install a forced ventilation system;
- for buildings with a foundation slab, you can depressurise the ground under the building by installing a radon well below or close to the building connected to an air extraction system.

# A barrier against radon gas: the proposal from the Mapei range

Radon is an element that should always be taken into consideration during the design stage, whether it is for renovation work on an existing structure or a new build.
A number of products from the Mapei waterproofing line can act as an effective barrier against ingress of water and radon gas. Of particular interest are products from the PLASTIMUL RANGE (PLASTIMUL 1K SUPER PLUS, PLASTIMUL 2K SUPER, PLASTIMUL 2K PLUS and PLASTIMUL 2K REACTIVE). These products are used to waterproof the horizontal and vertical foundations structures in concrete and brickwork, such as basements, underground garages, water tanks, load-bearing walls, and reinforced concrete structures underneath isolating screeds.
All these products are certified by the German testing-center Sachverständiger für Radon for their capacity to protect buildings against rising radon by creating a barrier impermeable to the gas.
Apart from the PLASTIMUL range, there is also the range of MAPETHENE waterproofing membranes for underground structures. This is a complete range of self-adhesive bitumen membranes made up of a film of cross-laminated, high-density polyethylene (HDPE) sandwiched to a mixture of bitumen and special SBS polymers.
Designed for waterproofing underground masonry and reinforced concrete structures externally, MAPETHENE membranes are a versatile range of products suitable for use both by waterproofing companies that normally use traditional bitumen membranes, and by companies that normally use other types of product.
Besides, Mapei also offers MAPEPROOF FBT, MAPEPROOF AL AP and MAPEPROOF SA fully-bonded membranes. These membranes are applied fully-bonded to poured concrete in order to prevent any lateral migration of water between the foundation structure and the membrane, thereby guaranteeing total impermeability.
Made from synthetic material, these membranes are also a valid barrier system to mitigate the passage of radon gas from the ground into indoor rooms and may be used for both new builds and during renovation projects on existing structures.

- MAPEPROOF FBT: waterproofing membrane made from a synthetic FPO membrane firmly sandwiched to a layer of non-woven fabric which, upon contact with poured concrete, guarantees a tough bond to the concrete.
- MAPEPROOF AL AP: is a waterproofing membrane made up of a synthetic HDPE sheet with an adhesive side covered with a pressure sensitive protective coating which, upon contact with poured concrete, forms a perfect bond.
- MAPEPROOF SA: waterproofing membrane made from a robust layer of high-density, cross-laminated polyethylene (HDPE) coated with a layer of tough, synthetic adhesive that forms a monolithic bond with concrete substrates.



The image show the use of MAPEPROOF FBT applied under slab (1) and MAPEPROOF SA applied on the vertical walls (2) to form a waterproofing layer and barrier against radon gas.

**WHY YOU SHOULD CHOOSE FULLY-BONDED MEMBRANES:**

NO NAKED FLAMES
THEY COMPLETELY BLOCK ALL WATER AND DAMP
COMPLETELY WATERTIGHT OVERLAPS
NO LATERAL MIGRATION OF WATER UP TO 7 BAR
PASSIVE BARRIER AGAINST RADON AND METHANE GASES
HIGHLY FLEXIBLE FPO MEMBRANES
UV-RAY RESISTANT

# RCR Arquitectes: space as a dialogue between interior and exterior

DESIGN VISION AND WORKS OF 2017 WINNERS RAFAEL ARANDA, CARMEN PIGEM AND RAMON VILALTA

*This edition of Realtà Mapei International marks the start of a feature column dedicated to architects who have won the prestigious Pritzker Architecture Prize and used Mapei products and systems for the execution of their designs.*

Created by Jay and Cindy Pritzker in 1979, the Pritzker Architecture Prize is considered to be the equivalent of a Nobel Prize for architecture. It is awarded every year to a living architect whose creations have made a significant contribution to humanity. The winners receive a prize of 100,000 dollars and a bronze medal inscribed with the words "firmness, commodity, delight" as a reminder of the three main principles of architecture according to *De Architectura* by the ancient Roman architect, Vitruvius: *firmitas, utilitas, venustas*. Over the years, the prize has been awarded to architects such as Renzo Piano, Norman Foster, Herzog & de Meuron, Zaha Hadid, etc.

## 2017: RCR Arquitectes

In 2017, the 39th Pritzker was won – for the first time since its introduction – by a trio of Spanish architects, Rafael Aranda, Carmen Pigem and Ramon Vilalta from RCR Arquitectes. In the opinion of the jury, their work, "Demonstrates commitment to a place and its story, creating spaces that dialogue with their respective contexts. By harmonising materiality and transparency, Aranda, Pigem and Vilalta search for a connection between interior and exterior, bringing to life a model of architecture that is both emotional and experiential".
The three Spanish architects, originally from Olot in the Girona region (northern Spain) where they founded RCR Arquitectes in 1988, graduated from the renowned ETSAV (Escola Tècnica Superior d'Arquitectura del Vallès) school of architecture.
Right from the very beginning, they have favoured a more locally-based dimension to their work and have operated mainly in the north-eastern part of Spain, although some of their projects have taken them to France, where they created the cultural complex on the Île Seguin in Paris, and to Belgium, with their Waalse Krook Urban Library of the Future and Centre for New Media in Gent.
A design vision seemingly less than global which, nonetheless, has never sought to understate their search for an architectural style that is both innovative and nonconformist.

When asked how a less than international vision had influenced the philosophy and values of the design studio, Aranda, Pigem and Vilalta replied, "Creativity is something that grows from your interior. And this interior has something to do with the way in which you interiorise all that is around you, something that does not depend solely on the place in which you live". The key themes that characterise their designs are not only related with the continuous connection between interior and exterior spaces, transparency, the presence of the passage of time on the materiality of a structure; but also innovative research into materials, with a preference for the use of Corten steel or, in certain cases, of simply recycled, rusty steel. The steel used in some of their designs, such as the Bell-Lloc winery, the Soulages Museum and the La Lira Theatre, are like an "architectural" expression of the passage of time.


Row House 2012 Olot, Girona (Spain).

The three architects have described their work as a continuous attitude towards essentiality, for the passion and research for beauty through the use of volumes and simple forms that bring them closer to the architects who, by their own admission, have influenced them over the years, such as Alvar Aalto and the Japanese design studio, Saana All enclosed within the idea at the very foundation of the work of RCR Architects: to push society towards an increasing awareness of the value of the role of architecture in our daily lives, as the quality of spaces also improves the quality of people's lives.

**"Creativity is something that grows from your interior, something that does not depend solely on the place in which you live"**

### ESPAI D'AIGUA I SALUT TARADELL

Mapei collaborated with RCR Arquitectes in 2015 in the construction of the Espai d'Aigua i Salut Taradell (EAS Taradell) indoor swimming pool.
Located in the municipality of Taradell (northern Spain), the single-storey complex (extending over an area of 2,600 m²) has a 6-lane, 20 m pool, a smaller pool for swimming courses, a sauna and Turkish bath, a gymnasium, an indoor cycling hall and a large polyfunctional meeting room.
For this project, Mapei supplied systems to repair and protect the concrete elements, to level off and waterproof substrates, to install ceramic tiles in the swimming pool, beach area and changing rooms and to install wooden flooring in the gymnasium.

## San Domenico Museums in Forlì

# Dante and the vision of art

Henry James Holiday
London (1839-1927),
*Dante Alighieri*
about 1875
Christie's private collection

MAPEI IS SPONSORING THE MAJOR EXHIBITION BEING HELD IN FORLÌ (CENTRAL ITALY) DEDICATED TO THE FATHER OF THE ITALIAN LANGUAGE ON THE 700TH ANNIVERSARY OF HIS DEATH

In accordance with its history and corporate credo based on its founder Rodolfo Squinzi's belief that "work can never be separated from art and passion", Mapei is strengthening its ties with culture and art even at a time like the present, when they are paying such a high price due to the consequences of the health crisis. Once again this year, continuing a well-established tradition, Mapei is supporting - as a Platinum Partner - an exhibition entitled "Dante. The vision of art" that is being organised at the San Domenico Museums in Forlì (Central Italy) from April to 11th July. The event's main organisers include, for the first time, the Uffizi Gallery, which is located in Florence, to provide an all-encompassing overview of the Great Poet as part of the celebrations promoted by the Italian Ministry of Culture, to commemorate the 700th anniversary of his death.
The exhibition does not just provide the chance to commemorate Dante in a fitting way: at this tricky moment in time for the entire world, it is also intended to symbolise recovery and rebirth in the whole world of art, culture and civilisation.
The project is based on an idea by Eike Schmidt, the Director of the Uffizi Gallery, and Gianfranco Brunelli, the Cassa dei Risparmi di Forlì Foundation's Director of Major Exhibitions. The exhibition's curators are Professor Antonio Paolucci and Professor Fernando Mazzocca, with the backing of a prestigious scientific committee. Choosing Forlì to host the exhibition is not by chance. Forlì is, after all, a city closely associated with Dante. After leaving Arezzo (Central Italy) in autumn 1302, Dante took refuge in Forlì with the Ordelaffi family that was ruling the city at the time. He returned to Forlì several times later in his life.

Beato Angelico (Vicchio, about 1395 - Rome, 1455)
*The Last Judgement*
Florence, San Marco Museum

**A journey through art and a journey in art**
The exhibition displays over 300 artworks taking visitors on a metaphorical seven-century journey through Dante's thoughts and philosophy.
Works have been loaned out by the Hermitage Museum in St. Petersburg (Russia), the Walker Art Gallery in Liverpool (UK), the National Gallery of Sofia (Bulgaria), the Staatliche Kunstsammlungen Dresden (SKD) in Dresden (Germany), the Toledo Museum of Art (Ohio, USA), the Musée des Beaux-Art in Nancy, Tours and Anger (France), the National Gallery of Modern and Contemporary Art and Borghese Gallery in Rome, the Vatican Museums, Capodimonte Museum in Naples (Italy) and numerous other museums.
For the first time we will be able to admire the most famous portrait of Dante painted in the 15th century by Andrea del Castagno after it has been meticulously restored. The Uffizi Gallery is also lending previously unseen works, such as, amongst others, an extensive selection of original drawings by Zuccari and Michelangelo. Further proof of Dante's fame outside Italy is the large portrait painted by Carl Christian Vogel von Vogelstein, one of the leading exponents of

## A PROJECT FOR YOUNG PEOPLE IN THE SUBURBS

Mapei is supporting "A REGOLA D'ARTE", a project devised and promoted by Mediafriends to help young people living in the suburbs of Italian cities. The project is aimed at promoting integration and social growth by means of an educational package in sport and culture taking the form of free rugby lessons, thanks to a partnership with A.S. Rugby Milano, and music lessons with the 'Lombardy Young People and Children's Choirs and Orchestras'.
Rugby promotes positive behavioural traits (unity, loyalty, respect, controlled aggression..) and music, Italy's great cultural heritage, can raise the understanding of culture of people who, for no fault of their own, would not usually have access to it. There is plenty of energy in the suburbs but, the same time, it is often hard to find the right way to mature and/or become good citizens. That is why the project is not aimed at training professional musicians or rugby players but rather at educating people to become respectable citizens fully integrated in social-civil society.
There will be three new "A Regola d'Arte" centres across Italy in 2021, including one in Forlì, a city in the Romagna region that is so important to Mapei and never-to-be-forgotten Adriana Spazzoli, the former Operational Marketing and Communication Director of the Group, who was born in Forlì and, like the rest of the Squinzi family, was closely tied to the city where she was born and its associationism, social projects, culture and sport.

Dante Gabriel Rossetti,
(London, 1828 – Kent, 1882)
*Salutation of Beatrice*,
Toledo Museum of Art, Ohio (USA)

Cristofano dell'Altissimo
(Florence, 1525 – 1605),
*Portrait of Dante Alighieri,*
Florence, Uffizi Gallery.
Gioviana Collection

Romantic painting in Germany.
The exhibition tour starts in San Domenico Church, where an exhibition entitled the "Universal Judgements" is being displayed. It includes works by Beato Angelico, Giotto, Cimabue, Michelangelo and Rosso Fiorentino. It then continues with Dante's first critically acclaimed work, i.e. the codes, the first illustrated editions of the *Divine Comedy* and drawings connected with the 'cantiche".
One theme area focuses on the rediscovery of Dante by painters belonging to the Nazarene movement, before moving on to Italian Unification Mythography when the Great Poet was elected to be the nation's father figure. Pictures by Pre-Raphaelite artists show Dante at the time when he wrote *La Vita Nova.*
The important display dedicated to the *Divine Comedy* begins with Hell and, in particular, includes various portraits of Paolo and Francesca by artists like Ary Scheffer and Jean-Auguste-Dominique Ingres, as well as Nicola Monti's *Francesca da Rimini in Dante's Hell*, one of his early works recently purchased by the Uffizi. The Purgatory section focuses on the subject of suffering and opens with the tragic figure of Pia Dei Tolomei and ends with Lorenzo Lotto's masterpiece *Transfiguration*. The exhibition draws to a close with Paradise that showcases works by Filippo Lippi and Tintoretto, a historicized copy of Michelangelo's first ***Pietà***, and Franz Von Stuck's celebrated ***Lucifer***.



# Celebrations in Ravenna

## ROMAGNA REGION FOR DANTE: THREE EXHIBITIONS FOR THE POET


The bells ring out thirteen times in Ravenna (Central Italy): every evening at 6 pm, a non-stop reading of the *Divine Comedy* around the poet's tomb brings Dante's poetry back to life in a flow of tercets. Dante, the father of modern poetry, still so alive 700 years after his death; Dante, our contemporary, still speaks to us every evening from the city that made him feel so welcome and still conserves much more than just his body.
This year the city's schedule of events is filled with Dante celebrations: Dante will not only resound around his own shrine but also in Classense Library, San Romualdo Church and the MAR (Ravenna Art Museum) that will be hosting exhibitions to be enjoyed with your "Eyes and mind", the motto chosen for this special anniversary.

**"The eyes and mind": three exhibitions**

A documentary exhibition entitled "Inclusa est flamma", which will be hosted in the main corridor of Classense Library through to 17th July, has a highly elaborate and extensive layout devoted to the six hundredth anniversary celebrations held in Ravenna from 11th to 14th September 1921. "Inclusa est flamma" (meaning "the flame burns inside") is the symbolic motto that D'Annunzio had printed on bags decorated by Adolfo De Carolis made of jute and filled with laurel leaves that were donated to the city in 1921. These bags placed at the very centre of the exhibition symbolise Dante's poetry, a universal flame that still burns brightly and lights up the nation like the eternal flame in his shrine. The exhibition also features some extremely rare books from the Olschki Dante Collection. This is a truly "precious" exhibition starting with its poster, the one designed by Galileo Chini in 1921 that had gone missing. The exhibition project continues in San Romualdo Church alongside Classense Library, where another exhibition entitled "The Arts at the time of Dante's exile" will be running from 24th April to 4th July. In addition to the backing of Ravenna City Council's Cultural Department and the MAR (Ravenna Art Museum), the Florence-based Uffizi Gallery will also be contributing to what is a sort of ideal twinship between these two Dantean cities. The exhibition "begins" in Florence with works by Cimabue and Giotto before following Dante's tracks to Rome, "embodied" by Pope Boniface VIII who was responsible for his exile, here taking the form of a gilt bronze statue from Bologna. It then continues to Padua, Verona and, finally, Ravenna, not forgetting certain figurative "interludes" in Venice, where the poet undertook his last diplomatic mission on behalf of Guido Novello da Polenta. During those turbulent years in Dante's life and for the Italian peninsula as a whole, the art scene was undergoing profound changes: the exhibition portrays this in the form of paintings, sculptures, miniature art, manuscripts and goldsmith's works. There are some prestigious loans from the Uffizzi Gallery, such as the *Badia Polyptych* (Giotto's masterpiece) and Maestro della Croce's *St. Francis receiving the stigmata* interacting with masterpieces of miniature art from El Escorial Museum and sculptures by Nicola and Giovanni Pisano and Arnolfo di Cambio. The *Madonna and Child* is back in Ravenna for the first time from the Louvre Museum, a work that was originally placed on the poet's sarcophagus: this artwork brings the journey through Dante's exile to a close. The third exhibition entitled "Un'Epopea POP" will be held at the MAR from 4th September 2021 to 9th January 2022. Dante still speaks to people of all ages and his works provide the key to modern and hyper-modern works, from fantasy fiction to digital literature. The exhibition pays testimony to all the various ways of reading and keys to interpreting his work that still inspires even the very latest artforms: film, cartoons, comics, video games. In the MAR's 16th-century cloister, a magnificent work of architecture designed by Edoardo Tresoldi leads through to a section on contemporary art curated and more recent works of Dante-inspired art from numerous countries around the world. Here again the layout takes the form of a journey that is both informative and thought-provoking: the sections about dreams, light and female figures are particularly striking.
Every single one of us, just like Dante himself, is heading towards the light and searching for our own Paradise: and so, Gilberto Zorio's work called *Stella Acidi* guides us towards our destination and helps us "see the stars again".

**Masterpieces of art in a layout underlining the richness and modernity of Dante's poetry**

**Wilma Malucelli.** President of the Committee of the Dante Alighieri Society in Forlì/Cesena

# Music is still in the air

MAPEI IS CONTINUING TO SUPPORT THE MOST IMPORTANT OPERA HOUSES, WHICH ARE STREAMING CONCERTS AND OTHER EVENTS DURING THE PANDEMIC

ph. Brescia e Amisano © Teatro alla Scala

## LA SCALA OPERA HOUSE IN MILAN

Art does not stop even during a pandemic and neither does the relationship between Mapei and La Scala Opera House in Milan. A bond that stretches way back into the past and derives from shared values and aspirations in the name of excellence and internationality, whose roots are very deeply embedded in culture and the territory. As a Permanent Founding Member and Supporting Member to La Scala Opera House, over the last year Mapei has supported, and continues to support, all the various initiatives implemented to keep the Opera House's wonderful music alive.

**"Being La Scala"**
La Scala Opera House is one big community of artists, workers, audiences, journalists, and experts, forming an intricate weave of ideas, passions, discussions, warm feelings, and frenetic energy. To keep this extraordinary community together, La Scala Opera House has launched a campaign on social media under the hashtag #WeAreLaScala. The Opera House will be posting pictures and stories on social media and, most importantly, it will be asking artists, workers and the general public to share (on their own social media) all those poignant moments when coming to La Scala, working there or watching shows were such a very special experience, helping create a sense of belonging and pride in being part of a community, the great La Scala community.
Anybody who has ever been to La Scala even once has their own story to tell, and this project is aimed at strengthening that feeling of being part of a bigger community: that of the world of Italian theatre, music and entertainment that has been ground to a halt by the pandemic. Because "Being La Scala" now means feeling part of all opera houses and theatres around the world, whose futures are under threat.
The best posts will be shared on the Opera House's social media, so we suggest you always use the tag @teatroallascala.

## SANTA CECILIA NATIONAL ACADEMY: HUGS IN MUSIC

"The sensorial experience of concerts is being notably hampered at present: you cannot listen live or have any direct contact with the artists. Musicians cannot embrace each other or hug members of the audience. Nevertheless, Santa Cecilia Academy has a long story of musical embraces to tell", so the President-Superintendent of Santa Cecilia National Academy, Michele dall'Ongaro, told us. Exactly one year lockdown in Italy first began, Santa Cecilia National Academy - one of the world's oldest musical institutions of which Mapei is a Founding Member - has sent out a special video message entitled "Hugs in music". Among those depicted embracing, as well as the Music Director, Maestro Antonio Pappano, and artists from Santa Cecilia Academy, we can also see other leading figures from the world of music: Ennio Morricone, Hans Werner Henze, Martha Argerich, Maurizio Pollini, Daniel Barenboim, Ezio Bosso and Nicola Piovani.
From 12th March 2020 and throughout the months of lockdown, Santa Cecilia Academy kept in close contact with its audience by streaming concerts recorded over previous years, each coming with its special programme available for downloading. Over the months, we have had the opportunity to get

to know members of Santa Cecilia Orchestra and Choir much better as they have shared aspects of their everyday lives with the public.
There have also been contributions from prestigious friends of the Academy, such as Valerij Gergiev, Diana Damrau and Federico Maria Sardelli, who have sent messages of support on the web. A sign of continuity that has reached everybody, including all those young people attending children's orchestra and choir classes: online educational material was made available to everybody enrolled on the courses, along with musical content and tutorials for people of all ages. A schedule of concerts by Santa Cecilia Academy can be watched through live streaming on TV and radio channels. Some of the concerts are available on demand from Raiplay or other bespoke platforms, such as IDAGIO to which Mapei has special access.

## LAVERDI SYMPHONY ORCHESTRA: MORE THAN JUST CONCERTS

Mapei is a Supporter-Benefactor of laVerdi Symphony Orchestra in Milan. When all the theatres were shut down a few months ago, laVerdi decided to explore the web, launching a fundraiser combined with plenty of content to be shared online. Symphony concerts, concert-lectures, chamber music concerts, solo performances and interviews with members of its orchestra and supporters, providing a variety of content carefully mirroring the wonderful range of artistic services offered by laVerdi Orchestra.
Since the fundraiser entitled "Emotions reawaken music (#DonaEmozioni)" was first launched on last November, the number of subscribers to laVerdi's YouTube channel has increased by 40% to a total of 45,000 and there have been over 90,000 views. The high point was reached with the New Year's Day Concert conducted by young Thomas Guggeis that was watched 37,000 times in just three days.
The Facebook campaign has been equally successful with 49,600 views of video content in just 28 days, as well as 21,619 interactions. In a

nutshell, an incredible success further underlined by the generosity shown by the public itself: over 30,000 Euros was collected in under a month, a totally unexpected amount. In 2021 laVerdi will have a new website providing access to all the orchestra's online activities.
laverdi.org is a virtual place where you can listen to the orchestra wherever and whenever you want.

**Biella (Italy)**

# ATP Challenger Tour

THANKS TO THE VERSATILITY OFFERED BY THE MAPECOAT TNS REMOVE SYSTEM, TWO PRO-GRADE TENNIS COURTS WERE SET UP IN RECORD TIME

The Biella Challenger Indoor is a professional tennis tournament held annually in Biella (Northern Italy), part of the ATP (Association of Tennis Professionals) Challenger Tour. This year the tournament was held on two courts: one is located in the historic PalaPajetta, a sports arena with all the characteristics required to host an ATP Challenger tournament, while the other is one of the indoor courts at the Joker sports centre. The two courts have completely different playing surfaces, neither of them suitable for playing tennis: the court in the PalaPajetta arena has wooden flooring whereas the one at the Joker centre is made of synthetic grass.

**An innovative system**

Mapei's proposal was to apply the MAPECOAT TNS REMOVE system on the two surfaces. This is the only system of its kind in the world and consists of acrylic resin in water dispersion in combination with a self-laying, fibre-reinforced PVC mat. It is used to create indoor and outdoor pro-grade tennis courts for temporary events.

MAPECOAT TNS REMOVE ensures the creation of flooring of the Hard-court category, but offers a level of playing comfort and elasticity that is much appreciated by professional tennis players. This type of playing surface has a very regular bounce, an excellent level of comfort during play and very high resistance. The surfaces are also durable and characterised by a high level of resistance to wear and abrasion, as well as being seamless and flat with a very attractive finish. Besides, it is solvent-free, a particularly important characteristic. And lastly, the system can be installed very quickly, which means down times are limited.

Having already placed temporary wooden flooring over the synthetic grass court at the Joker centre, installation of the PVC MAPECOAT TNS RP mat on both courts was pretty straightforward. MAPECOAT TNS RP is an innovative PVC mat with special reinforcement which, thanks to its excellent dimensional stability, is suitable for outdoor use.

Also, because it is a "floating" type mat and does not need to be bonded to the substrate, it can be used to create new playing surfaces even in areas where, until now, the old substrate would have had to be removed or rebuilt. Thanks to its elasticity and versatility, MAPECOAT TNS REMOVE may also be used for temporary sports events where a playing surface that can be easily removed and then re-used is required.

The two courts remained in place for around one and a half months, enough time for four tournaments to be held, as decided by ATP (Association of Tennis Professionals). Thanks to the MAPECOAT TNS REMOVE technology, when the tournaments were over, the temporary playing surfaces were removed easily and quickly and put to one side until they are needed again for the next tournament.

## MURRAY IS THE MAIN ATTRACTION

Mapei sponsored the 4 ATP tournaments (including the ATP Challenger 80 and Challenger 125 indoor) that all took place in 28 days of great tennis in Biella. The Mapei brand was very visible on banners around the courts, on two of the playing surfaces, and on digital/paper material publicising these events.

All the matches were streamed live on the official ATP (Association of Tennis Professionals) website. The Italian TV channel Sky Sport also broadcast the semi-finals and finals of the Challenger 125 tournament live. Andy Murray was the main attraction at the 80 tournament for players needing to improve their international rankings. The tennis player from Glasgow, was once number one in the ATP rankings and has won two Olympic gold medals. The streamed coverage of Murray's matches was watched by most people, but he had to settle for being runner-up after losing 6-2 6-4 in the final against the Ukrainian player Illja Marčenko. Luis Martinez (Colombia) and David Vega Hernandez (Spain) won the Challenger 80 doubles event after beating the Polish pair, Szymon Walków and Jan Zieliński. The "125" tournament was won by the South Korean player Kwon Soon-woo. One of the semi-finals was an Italian derby between Lorenzo Musetti and Andreas Seppi with Musetti winning 3-6 6-3 6-4. Kwon Soon-woo won the other semi-final against the Russian player Evgenij Donskoj. Soon-woo then outplayed Musetti in the final: 6-2, 6-3. Hugo Nys (Poland) -Tim Putz (Germany) beat Lloyd Glasspool (Great Britain) - Harri Heliövaara (Finland) in the 125 doubles final.



The matches of the ATP Challenger 80 and Challenger 125 indoor tournaments were played on temporary surfaces completed with MAPECOAT TNS REMOVE.

**MAPECOAT TNS REMOVE**

Multi-layered flooring system of acrylic resin in water dispersion and selected fillers which may be used to make pro-grade indoor and outdoor tennis courts.

**FIND OUT MORE**

**TECNICAL DATA**
**Tennis courts at PalaPajetta and Joker centres,** Biella (Italy)
**Period of construction:** 1993

**Year of the Mapei intervention:** 2021
**Intervention by Mapei:** supplying products for temporary sport surfaces
**Client:** Tennis Lab

**Installation company:** AMC Green srl
**Mapei coordinators:** Marco Cattuzzo and Andrea Pillepich, Mapei SpA (Italy)

**MAPEI PRODUCTS**
Installing tennis courts:
Mapecoat TNS Remove

For further info on products see mapei.com

# Sport during the Covid-19 pandemic

## FROM MEDICAL CHECK-UPS TO TRAINING PLANS: MAPEI SPORT CENTER HAS ADAPTED ITS SERVICES TO THE NEW NORMAL

The battle against the pandemic caused by Covid-19 is continuing and during this extremely complicated period, sport is really helping millions of people cope. By going for a quick run outdoors, taking a short bike ride on your own or just a few minutes of physical exercise at home, you can look after your own physical and mental health.

**Professional sports people are now back in action**

Pro athletes were the first back in action, performing in empty stadiums, taking a battery of swab tests, and being isolated in special “bubbles”. For instance, the NBA managed to complete its season by shutting way the players and staff in Disney World in Florida (USA). The 2021 World Alpine Ski Championships held in Cortina (Northern Italy) took place without the usual noisy spectators. Italian professional footballers have all taken over a hundred PCR tests for Covid-19 over the last year and cyclists, forced to stay in all kinds of hotels, have lost count of how many tests they have taken. Nothing is how it used to be and even the world of sport has had to adapt.

That is why a study recently carried out by researchers at Mapei Sport has analysed how professional footballers managed to keep physically fit training at home during the six-week lockdown from March to April 2020. In a publication entitled "Impact of Covid-19 Lockdown on Serie A Soccer Players' Physical Qualities" that appeared in the *International Journal of Sports Medicine,* Ermanno Rampinini, Federico Donghi, Marco Martin, Andrea Bosio, Marco Riggio and Nicola Maffiuletti compared Sassuolo’s first-team players’ post-lockdown results from the Mognoni test and vertical jump test with their results from the same tests conducted during normal seasons in the past. Their stamina and endurance (anaerobic fitness) had actually improved significantly after the isolation period, suggesting that footballers had found the time and means alone at home to focus on improving this side of their fitness compared to past seasons. In contrast, a lack of specific strength and power training combined with the absence of the specific stimulus coming from competitive matches and, more generally, from intermittent drills, meant they had lost power in their legs. Training in confined conditions meant the footballers had lost those specific abilities that can only be trained on the pitch, so this had to be the focus of attention when training was resumed.

Following a long and unusual break of the kind we have just been through, even amateur sports people should resume training progressively in accordance with their current fitness level. The lockdown impacted on everybody’s lives in a way that has never happened before.


**1.** Laboratory tests for players from Sassuolo women’s football team.
**2.** Disinfecting Mapei Sport's premises using MicroDefender machinery manufactured by Work In Progress Bio-Medical Srl.

**The athlete’s health is the main priority**

Even during a health emergency like this, a specialist medical-sports check-up is a crucial means of screening and prevention in general. The Mapei Sport Research Center adapted the services it has been providing since 1996 to cater for modern-day needs. “Obtaining post-Covid medical certification to resume training and compete in your favourite sport is a vital steppingstone in returning to normality. This kind of medical check-up includes specific clinical examinations conforming to the recommendations set down by the Italian Sports Medicine Federation (FMSI) and ratified by the Italian Ministry of Health. From a medical and health viewpoint, it is part of a “recertification” process for professional athletes and anybody taking part in competitive sport, but it is also vitally important for anybody who has recovered from Covid-19. It is vital to make sure that this incredibly insidious illness has not left any after-effects on the body or alterations to organs or apparatuses that are often symptomless and go undetected”, so the Director of Mapei Sport, Claudio Pecci, noted.


Field tests for Olympique Lyonnais footballers.

**Following a long break, even amateur sports people should resume training progressively**

The pandemic is having an unprecedented health/social/economic impact, whose effects will be felt for years. Our health is not, however, just being threatened by the Covid-19 infection but also by restrictions imposed to break the chain of infections. As well as increasing stress, anxiety, symptoms of depression and insomnia and causing a general decline in mental health, being shut away at home has also changed our daily habits, making us less physically active and more likely to follow an unhealthy and imbalanced diet. That is why it is more important than ever now to look after your health, investing time and resources in enjoying sport.

**Getting safely back to normal, from every viewpoint**

While waiting for gyms and swimming pools to reopen, the Mapei Sport Research Center is a safe haven for sports people.

The facility, which is backed by the Mapei Group, conforms to the very highest safety standards. Not only has it adopted all the measures specified in the rules and regulations in force to protect its staff and customers, it has also tightened its own internal protocols and invested significantly in sanitising its premises.

Thanks to a close working partnership with ASkyClean and advice from Professor Maurizio Podico, all the MicroDefender machinery manufactured by Work In Progress Bio-Medical Srl systematically disinfects every area of the Center’s headquarters in Olgiate Olona (Province of Varese, Northern Italy) corresponding to a total of 30,000 $m^3$ of disinfected space each month. The locker rooms are only available on a strictly individual basis and disinfected every time they are used. The medical facilities are also given the same kind of daily treatment and the air-conditioning and heating systems are sanitised on a quarterly basis. This is not only intended to get rid of Covid-19 and its variants, but also any other kind of pathogenic microorganism commonly found in air-conditioning systems.

For further information about Mapei Sport’s services in English language: mapeisport.it.

**Giulia De Maio.** Mapei Sport Research Center (Italy)

# Our eight years in Serie A: Constant growth

## CARNEVALI, CEO OF SASSUOLO, TAKES INITIAL STOCK OF SASSUOLO'S SEASON AND FUTURE PROSPECTS

Sassuolo's CEO and General Manager, Giovanni Carnevali.

Just a few weeks from the end of the season of the Italian Serie A championships, Sassuolo is still on track to finish in the top seven in the league table and qualify for international competition next season.
"During our eight seasons in the Italian Serie A, we have kept on improving. Italy's top division is a tough league and you cannot take anything for granted. Our aim is always to qualify for Europe", so Giovanni Carnevali told us, Sassuolo's CEO and General Manager.
Lots of top Italian and foreign clubs are interested in buying several Sassuolo's players in the next few months.
"The ongoing transfer rumours - so Mr Carnevali pointed out - are definitely a distraction for the players being targeted. On one hand we are proud of all the interest from big clubs: it means we have done our job well. But some of the most in-demand players are youngsters and they are being distracted by talk of transfers".

**Ever since December Sassuolo has looked strong in midfield and up front but vulnerable in defence.**
"It's true that Sassuolo's style is focused on playing well and always trying to score. That inevitably means we can often push forward too much, a risk we are well aware of.
Ever since Di Francesco was our team manager, we have never been a defensive-minded team".

**RIGHT.**
Junior Traorè breaks free from his marker, Zappacosta, in the Sassuolo – Genoa match.

**Sassuolo's performances in 2021 have been up-and-down.**
"I think we need to take stock at the end of the season, because every team struggles physically at some stage of the season and our moment was the beginning of 2021, partly because we have had a few too many injuries. With such a hectic schedule of games, our performance was bound to dip at some point".

**Matches are being played in empty stadiums due to Covid-19. Is it still an advantage to play at home?**
"It is definitely less of a factor compared to previous seasons".

**Everything was going well in the league and the team was in a position to qualify for Europe, then Sassuolo lost 2-1 at home to Spezia, making life more difficult.**
"There are always a number of reasons for losing, including a lack of concentration or a moment's madness. It just shows that we have not yet progressed enough to avoid certain mistakes, although you should never forget that credit should also go to the other team".

**The important 3-2 win against Verona came thanks to a goal by Traorè. Last year Mr De Zerbi described Traorè as an "anarchic talent". He now seems to have settled down much better.**
"There is no question he is talented, considering what he has already achieved at such a young age. But he still has an incredible amount of room for improvement, he just needs to pay attention to the manager. He is not wasting his talent; if he really works hard, he could do great things, but he still has a long way to go".

**Which has been Sassuolo's best game so far this season?**
"The match we won against Napoli at Maradona Stadium during the first half of the season".

**The return match against Napoli ended in a 3-3 draw with a dramatic ending involving closely contested penalties. Did you complain about the referee after the match?**
"You are often unhappy with the refereeing, but it is not Sassuolo's style

# Sassuolo is focused on young players

## PALMIERI: "WE HAVE EXPERT SCOUTS AND COOPERATE WITH LOCAL SCHOOLS"

Alongside stars like Berardi, Caputo, Consigli and other regular first-team players in the Italian Serie A, Sassuolo also has 300 other club members in 13 different male youth teams. Ages range from 9 up to 18-20 in the youth team.
Having so many new young players is a record for a team that has only been in the top division for eight seasons. "Our youth team - so Francesco Palmieri pointed out, the head of Sassuolo's youth sector - is doing well in this year's league". At the beginning of the 2020-21 season, Sassuolo's youth team staff had high hopes for Brian Oddei. "Unfortunately - so Mr Palmieri told us - Oddei has hardly played at all for the youth team: De Zerbi, manager of the first team, promoted him to the first-team squad in October. With Oddei playing, the youth team would probably have a few extra points, but we are even more pleased to see him in the first-team squad.
De Zerbi has played him several times in official matches and that is the most satisfying thing of all for the youth team sector. We work with young players to get them ready to play in the Series A, not just to win youth team tournaments. There are other youth team players who are also ready to play at the highest level. Unfortunately, Covid-19 is causing real problems for the youth team championship". Sassuolo has great faith in its youngsters. "I hope the whole of football does", so Mr. Palmieri emphasised. "Sassuolo owes much of its success to its first-team squad that has been so successful in the top league, but the club has also done some incredible work with its young players. It is great to work with young people, but you have to have faith in what you are doing. The work my staff and I are doing with the youth teams is focused on helping them turn professional, otherwise it would be pointless. I have the support of highly dedicated assistants, who work selflessly out of the spotlight and make a huge contribution."

**FOREIGN PLAYERS, EDUCATION AND SCOUTS**
There are players in the youth teams who live a long way from Sassuolo, and there are even some young foreign players. "We have a wonderful relationship with schools

**ABOVE.**
Sassuolo-Empoli is a classic youth team fixture.i

**"Big clubs' interest in our players makes us proud. It means we have done our job well."**

to complain publicly. Technology now spotlights mistakes, an<d the referee is the first to realise that after the game. Even a referee can have a bad match, mistakes happen".

**Sassuolo has won some of its matches playing brilliantly, like for example the away win against Crotone, and the team also got a hard-earned draw at Cagliari. On the negative side, Sassuolo was winning 2-0 with 15 minutes to play in the match against Torino but ended up losing 3-2.**
"When referees make mistakes at our expense, I do not get angry. On the other hand, I get really angry when we lose a match playing badly. Conceding three goals in the last few minutes is not acceptable. We definitely tired physically but, most significantly, we really lost our concentration. Perhaps we were overconfident: we were already 2-0 ahead at half-time and playing well but no match in the Italian Serie A is over until the final whistle has blown. I got really angry with the players. Sometimes we get the chance to really move forward but we squander the opportunity because there are so many young players in our team and we lack a bit of experience. We always knew that focusing on young players was a risk, but I am certain that by working hard we will make the necessary adjustments".

**Compared to the 2019-20 season, what more do we know about Berardi, Caputo and Boga?**
"Berardi is having an incredible season and he has not played one single bad match. He is a real leader on the pitch. Caputo is showing what a great goal scorer he is, despite the odd injury problem. Unfortunately, Boga is struggling this season and has had a number of physical problems. Covid-19 meant that he could not play or even train at the beginning of the season and then he got a muscle injury. We are now well into Spring and we still have not seen the Boga we admired last season".

**TWELVE SASSUOLO PLAYERS CALLED UP FOR INTERNATIONAL DUTY**

At the end of March, twelve Sassuolo players were called up for their national teams. The players in question are Berardi, Ferrari, Caputo and Locatelli for Italy, Ayhan and Müldür for Turkey, Chiricheş (Romania), Djuricic (Serbia), Haraslin (Slovakia), Kyriakopoulos (Greece), Obiang (Equatorial Guinea). Raspadori was also selected for the Italy Under 21 squad.

**ABOVE.** Action during the youth team match between Sassuolo and Atalanta.

– so Mr Palmieri noted -, we believe education is extremely important for our young people's future. We also work closely with local football clubs to scout for new players. It is not easy to spot talent; we operate in the Emilia region where there is plenty of competition from famous old clubs in the top two divisions". When there was no chance of catching Covid-19, Sassuolo's youngsters trained 3-4 times a week. "We have stopped youngsters from playing at the moment, but to make sure they are healthy and safe, we test them and provide medical aid. The club's owners at Mapei are wonderful and help us do our job really well. Giovanni Carnevali, Sassuolo's CEO and General Manager, also provides plenty of input. Without them it would be impossible to implement certain strategies.".
Sassuolo has an excellent scouting network: "We employ 10 full-time scouts and 5 others also help us out. We try to be the first to spot foreign talent, too".

IN JUST A FEW YEARS, 190 YOUNG FEMALE PLAYERS HAVE BECOME MEMBERS OF SASSUOLO WOMEN'S FOOTBALL CLUB

# A pilot project for developing young footballers

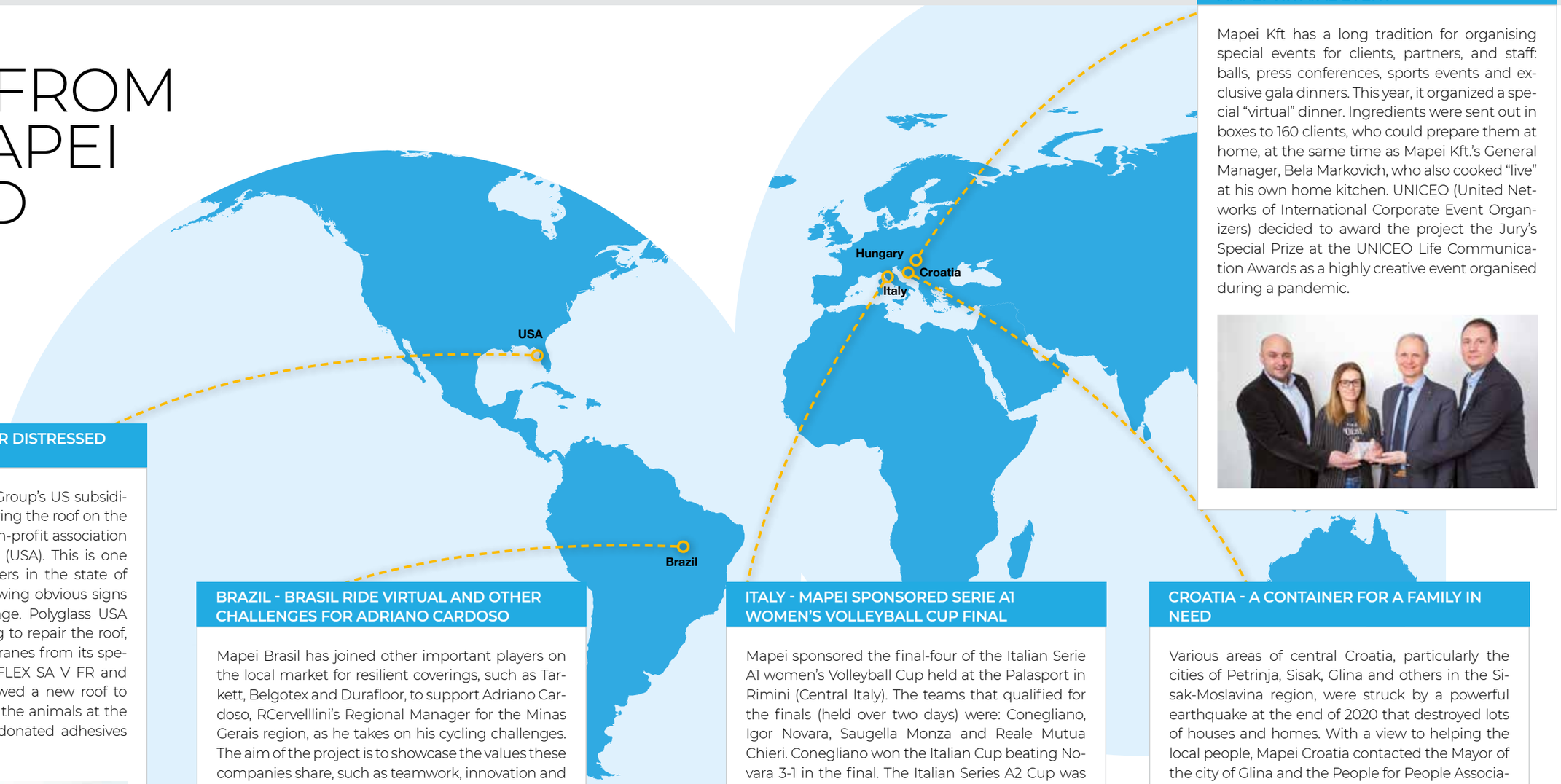
Sassuolo women's first team is near the top of the league and it also has an exceptional youth squad. Even though women's football only began at the club a few years ago, it already has 190 female members belonging to 9 teams training in Sassuolo and Reggio Emilia.
"Our plan was to attract more players to expand the women's side of the club. There is no future without young female players. Of course, we have tried (successfully) to consolidate our position in the top league. We have been in the Italian Serie A for four years now and keep on improving", so Alessandro Terzi told us, the Head of Sassuolo Women's Sector.
Sassuolo can also boast being the first Italian club to organise the women's Champions League Final that was held at Mapei Stadium in 2016: "We feel we are part of a pilot project for developing female footballers".
So, what can be done to help young female footballers?
"First and foremost, get more girls involved and strengthen our pyramid system. Covid-19 issues have put the brakes on some of our ideas. Last season was interrupted and all the work we had done went to waste. We tried to coach the girls individually but there are still no competitive matches for young players. Football and education have both been stopped in Italy and years are being wasted. It is a real problem", so Terzi went on to say.

**The team is constantly near the top of the Serie A football league**

**DREAMING OF CHAMPIONS LEAGUE**
Sassuolo women's football team is in the top three of the Italian Serie A.
"I am delighted - so Alessandro Terzi told us - because we are well ahead of some big-name teams". Sassuolo was only very narrowly beaten by AC Milan in the Italy Cup after drawing both the home and away legs. "It was a real pity - so Mr Terzi emphasised - because we could easily have won at least one of the two matches".
The team managed by Gianpiero Piovani has worked really hard over the last two years: "We had set certain goals, - so Mr Terzi pointed out - and, playing with real flair and determination, the team has already hit these targets regardless of how the 2020-21 season finishes".
"I have told the team that dreaming is free. Our dream is to finish second and we have to take our chance if we get one: anything can happen in football. We will be playing AC Milan in the second to last game of the season and if they slip up, we will take full advantage of it".
Before passing away, Mr Giorgio Squinzi's biggest wish was for the men's team to qualify for the Champions League. Perhaps it will be the women's squad that gets into the Champions League for the first time. "That would make me really proud", so Mr Terzi replied.

# NEWS FROM THE MAPEI WORLD

EVENTS, SPONSORSHIPS AND PROJECTS BY THE GROUP'S SUBSIDIARIES




## USA - POLYGLASS USA FOR DISTRESSED ANIMALS

Polyglass U.S.A., one of the Group's US subsidiary, has contributed to repairing the roof on the "Abandoned Pet Rescue" non-profit association building in Fort Lauderdale (USA). This is one of the biggest animal shelters in the state of Florida, whose roof was showing obvious signs of leaking and water damage. Polyglass USA worked with Perkins Roofing to repair the roof, donating waterproof membranes from its special range, such as ELASTOFLEX SA V FR and POLYFLEX SA P, which allowed a new roof to be fitted without disturbing the animals at the shelter. Polyglass USA also donated adhesives and technical assistance.

## BRAZIL - BRASIL RIDE VIRTUAL AND OTHER CHALLENGES FOR ADRIANO CARDOSO

Mapei Brasil has joined other important players on the local market for resilient coverings, such as Tarkett, Belgotex and Durafloor, to support Adriano Cardoso, RCervelllini's Regional Manager for the Minas Gerais region, as he takes on his cycling challenges. The aim of the project is to showcase the values these companies share, such as teamwork, innovation and quality, and to encourage people to get involved in sport. Last year Mr Cardoso took part in Brasil Ride Virtual, a cycling race focused closely on distancing and other safety measures to prevent Covid-19 from spreading. This year Mr Cardoso plans to take part in 7 competitions from February to August in various regions of Brazil.

## ITALY - MAPEI SPONSORED SERIE A1 WOMEN'S VOLLEYBALL CUP FINAL

Mapei sponsored the final-four of the Italian Serie A1 women's Volleyball Cup held at the Palasport in Rimini (Central Italy). The teams that qualified for the finals (held over two days) were: Conegliano, Igor Novara, Saugella Monza and Reale Mutua Chieri. Conegliano won the Italian Cup beating Novara 3-1 in the final. The Italian Series A2 Cup was held at the same time: Macerata-Mondovì 3-0. Rai Sport (Italian State television) broadcast all the Series A1 final-four matches live. A total of 500,000 viewers watched the live matches. An average television audience of 202,053 viewers watched the final between Conegliano and Novara.

## CROATIA - A CONTAINER FOR A FAMILY IN NEED

Various areas of central Croatia, particularly the cities of Petrinja, Sisak, Glina and others in the Sisak-Moslavina region, were struck by a powerful earthquake at the end of 2020 that destroyed lots of houses and homes. With a view to helping the local people, Mapei Croatia contacted the Mayor of the city of Glina and the People for People Association, which put the company in touch with a family of four who had been left homeless. The Group's Croatian subsidiary decided to donate a container home to the family (which, in the meantime, had had a new addition to its number, a baby girl) where they could live while waiting for their own homes to be repaired.

## HUNGARY - UNICEO PRIZE FOR THE 2020 MAPEI VIRTUAL EVENT

Mapei Kft has a long tradition for organising special events for clients, partners, and staff: balls, press conferences, sports events and exclusive gala dinners. This year, it organized a special "virtual" dinner. Ingredients were sent out in boxes to 160 clients, who could prepare them at home, at the same time as Mapei Kft.'s General Manager, Bela Markovich, who also cooked "live" at his own home kitchen. UNICEO (United Networks of International Corporate Event Organizers) decided to award the project the Jury's Special Prize at the UNICEO Life Communication Awards as a highly creative event organised during a pandemic.

# Master Collection: more than 1,000 original shades

Available in English at mapei.it

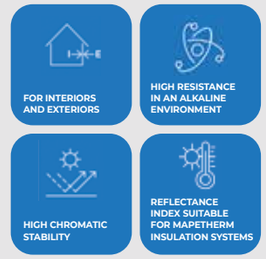
## COLOR YOUR HOME AND MAKE IT UNIQUE, LIKE YOU



Thanks to its wealth of experience and constant research into innovative products, Mapei manufactures over 1000 colours for wall coatings and thermal insulation systems. Colours designed to meet the specific needs of individual projects that can be manufactured with precision and reliability.
Thanks to its ColorMap colouring system, any colour can be created, reproducing samples and **creating colours** to meet town-planning constraints or be combined with specific types of furnishing.
Mapei coatings for external walls have excellent hiding power and filling properties, are easy-to-use, water-repellent, elastic, resistant to UV rays, breathable and cleanable. From the experience it has gained working with coatings for outdoors, Mapei has also developed high-quality products for protecting and decorating interiors.
Mapei's full range of coloured coatings is available from the website mapei.it.

### Select your colour

The "Master Collection – Wall Coatings" webpage can be found in the "Tools&Download" section of mapei.it website. Using a "colour picker", you can select **the colour range** you are interested in and then pick exactly the colour you want from the full selection.
The photo alongside changes when you click on the colours; you can choose a view of either an interior or an exterior.
**The colour files can be downloaded** from the "Mapei Master Collection", which is extremely useful for design purposes. You can also contact your local Mapei expert.




**Visit the Master Collection page and select your colour**

Bring beauty to your home with the exclusive **Mapei Master Collection: more than 1,000 shades** for finishing and insulation systems to protect and decorate the walls of your home to perfection. Choose your favourite colours: **mapei.com/mastercollection-en**

# Exposed-aggregate decorative paving

## MAPEI COLOR PAVING® FOR MODERN CONCRETE PAVING

When we are out strolling in a public park, cycling on a track or waliking on a foothpath in a historic town centre, at some point we will have found ourselves walking across a surface in loose gravel.
The natural appeal of this type of paving with a rustic-effect finish adds a touch of style to any setting where it is used. Needless to say, this is a type of paving that requires regular and careful maintenance: it has to be cleaned constantly to remove leaves and grass, repairing hollows and rutting, especially where vehicles pass, and wetting surfaces to eliminate dust.
The answer to these inconveniencies may well be modern concrete paving with an exposed-aggregate finish. This type of decorative paving is usually coloured, it is easy to apply and is very strong, durable and resistant.
It is made from locally sourced aggregates and natural stone, to remain in line with the local geographical context in which it is applied. Compared with traditional gravel paving, it is more compact, uniform and resistant, and is also easy to clean and drive over by vehicles, with no need to be regularly maintained. For this purpose, Mapei proposes MAPEI COLOR PAVING®

**Where can decorative MAPEI COLOR PAVING® be installed?**
Gardens, parks and villas, private and public footpaths, pavements, courtyards and porticoes, historic town centres and driveways leading to historic or modern homes: wherever you wish to create decorative paving in coloured, exposed aggregates with a surprisingly natural finish.

**What is the MAPEI COLOR PAVING® system?**
It is a system for decorative washed concrete paving with an exposed-aggregate finish. It is the result of a project which aimed at obtaining a natural, custom-made effect, able to fully match the surrounding environment, combined with the mechanical strength and durability typical of concrete floors. The system is composed of three elements: concrete, COLOR ADMIX PAVING admixture, and MAPEWASH PO surface set-retardant.

**What does COLOR PAVING ADMIX actually do?**
COLOR PAVING ADMIX is a pre-blended, fibre-reinforced, multi-purpose mix of powder admixtures that guarantees the durability and mechanical strength of the paving, helping concrete mixes achieve exposure class XF3, as specified by European standard EN 206:2016 for this type of use (featuring high mechanical properties, resistance to freeze/thaw cycles).
COLOR PAVING ADMIX improves the workability of concrete, helps reduce the amount of mixing water required to prepare the mix, improves the resistance to freeze/thaw cycles, guarantees uniform viscosity throughout the mix, limits the formation of cracks during the plastic phase of concrete, colours the cementitious matrix, impedes the formation of unsightly saline efflorescence and helps keep the exposed aggregates stable when the paving is in service. The usual rate is 25 kg of COLOR PAVING ADMIX for every $m^3$ of concrete to be prepared.

**And what is MAPEWASH PO for?**
This product is a surface-set retardant made from biodegradable vegetable oils with a curing effect. As the concrete is levelled off and smoothed over, MAPEWASH PO is gradually applied over the surface with a low pressure atomiser spray to form an even, seamless film. The function of this admixture is to delay setting of the concrete at the surface so that it can then be blasted with high-pressure jets, which removes the top few millimetres of the cementitious matrix to reveal the coloured stones or gravel chosen for that particular project.

**What is the general procedure to create this type of paving?**
Depending on the final area of use, the type of base-layer, the pattern of the paving and any other requirements, a concrete slab has to be designed with proper thickness, mechanical strenghts, and, if required, steel/fibre reinforcement and joints. Concrete is then produced using the aggregates in the desidered size and colour, adding COLOR PAVING ADMIX to the mix before placing the mix. While the concrete is being placed, gradually apply MAPEWASH PO over the surface. After around 24 hours, hydro-blast the surface to remove the sand and cement from around the aggregates (gravel) and this gives you the finish required, which also depends on the concrete mix used.

**Why choose Mapei?**
Because from the design stage of the concrete mix to the placing of the concrete, Mapei’s Technical Services work alongside the client, their designers, and the team on site. MAPEI COLOR PAVING® technology guarantees reliability and total respect for the environment by using locally-sourced resources, contributing to our perceived sense of wellbeing in the surroundings we live in.

**Marco Albelice, Giuseppe David,** Technical Services, Mapei SpA

# 3 Products in the spotlight

INSTALLING WOOD WITH A LIGHTWEIGHT ADHESIVE, PROTECTING WALL COATINGS, FINISHING RESILIENT COVERINGS: A FEW SOLUTIONS BY MAPEI

### ULTRABOND ECO S LITE

One-component, lightweight, silylated polymer-based adhesive, ideal for bonding all types of pre-finished or presanded multilayered wooden flooring and medium sized planks of solid wood. It features very low weight density leading to lower consumption rates per $m^2$. Due to the Ultralite technology, buckets of ULTRABOND ECO S LITE have the same volume but weigh less than bags of conventional adhesive. This makes handling easier and ensures savings in transport costs. Moreover, the yield is higher.
ULTRABOND ECO S LITE is easy to apply and contains no water, solvent (according to TRGS 610), amines or epoxy resin and is $EC1^{Plus}$-certified (very low emission of volatile organic compounds) by GEV.

**LOW WEIGHT DENSITY, HIGHER YIELD**

### COLORITE BETON

Semi-transparent paint, based on pure acrylic resin in water dispersion. It protects cementitious substrates against damage caused by $CO_2$ (carbonation) and $SO_2$.
It is resistant to all climatic conditions, pollution, salt and sunlight, and gives the substrate a long-lasting protective and smooth finish. It is ideal for painting concrete structures, reinforced concrete and general cementitious surfaces, leaving the "formwork" or "fair-faced" finish visible. It is ideal as protective coat for big infrastructural works, such as viaducts, bridges, etc.
It meets the requirements of European standard EN 1504-2 ("Surface protection system for concrete") and has its own EPD (Environmental Product Declaration).

**ENSURING ANTI-CARBONATION AND A SMOOTH FINISH**

### MAPECOAT WET & DRY R11

Two-component aliphatic, anti-slip polyurethane finish in water dispersion, for resilient floor and wall coverings, such as LVT, PVC, rubber or linoleum.
It guarantees slip-resistance of class R11 in compliance with DIN 51130; slip-resistance (bare feet) of class A+B in compliance with DIN 51097; slip resistance in compliance with EN 13036-4 (pendulum test) and according to method B.C.R.
MAPECOAT WET & DRY R11 is also resistant to attack from the main strains of bacteria (using the method described in the standard ISO 22196), to cleaning cycles, spread of mould (in compliance with Italian standard UNI 11021), different washing agents and disinfection agents in compliance with UNI EN ISO 2812-1.

**HIGH RESISTANCE TO SLIP AND ATTACK FROM BACTERIA AND MOULD**

# MAPEI FOR YOUR HOME

**Choose reliability, durability and respect for the environment.**

Restoring masonry, strengthening structures, waterproofing your terrace, installing flooring and paving, refurbishing your bathroom, painting and protecting your façades. Put your trust in **more than 80 years of experience** gained by Mapei on sites **all around the world**.

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